FOUNDRY TRADE JOURNAL

EST. 1902

WITH WHICH IS INCORPORATED THE IRON AND STEEL TRADES JOURNAL

VOL. 109
No. 2292
Registered at the G.P.O. as a Newspaper

NOVEMBER 10, 1960
Offices: John Adam House, John Adam St., London, W.C.2

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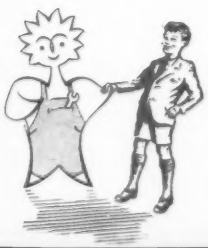

...in all ways. Today, computer controlled machine tools — what of tomorrow? He will grow up with Mr. Therm, for each advance in production techniques will be helped by the unceasing research of the Gas Industry into gas utilisation. Through the twelve Area Gas Boards, the Gas Industry offers an unrivalled free technical advisory service on fuel to the many trades and industries which it serves.

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COROVIT

COLD SETTING CORE TECHNIQUE

Fordath are sole manufacturers and distributors in the United Kingdom under exclusive licence from Reichhold Chemie A.G. Switzerland, who are proprietors of British Patent Nos. 653,530 and 761,035

ANNOUNCEMENT

THE FORDATH ENGINEERING COMPANY LIMITED, who are the suppliers of the well-known COROVIT range of cold-setting binders (consisting mainly of processed drying and semi-drying oils) and accelerators, desire to draw the attention of foundries to United Kingdom Patent Nos. 653,530 and 761,035, the property of Reichhold Chemie A.G. of Switzerland, under which Fordath have exclusive rights.

The Patents are concerned with the use of certain accelerators, in conjunction with drying oils in foundry sand. The claims of the patents are so framed that, where the patents are infringed, it is the foundry that infringes (and so is liable for any damages that are involved) and not the seller of the accelerator, nor even the seller of the drying oil.

Foundries should therefore be aware that the use of such accelerators, without the authorisation of THE FORDATH ENGINEERING COMPANY, could involve them in liability for infringement notwithstanding that the accelerator or oil concerned is openly on the market; and that, in the event of such liability, they may be without recourse against the sellers of the accelerator or oil concerned.

Acknowledged as the greatest advance in the making of heavy and complex cores in the history of the foundry.

THE FORDATH ENGINEERING CO. LTD., BRANDON WAY, WEST BROMWICH, STAFFORDSHIRE
Tel: West Bromwich 1665 (4 lines) Telegrams: FORDATH TELEX WEST BROMWICH. TELEX No. 33415.

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NO WASTE CASTINGS when you use SPERMOLIN core oils and binders

Photo by courtesy of Messrs. Macmillan Foundries Ltd, Watford

FOR quantity production of small cores or a special one-off job of exceptional size you can rely on Spermolin Core Oils and Binders for consistent accuracy. Short baking cycles and low sand core costs are but two more of the many advantages.

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A LARGE NUMBER OF THESE BOXES WERE MADE WITH ONLY ·003" PIN CLEARANCE.
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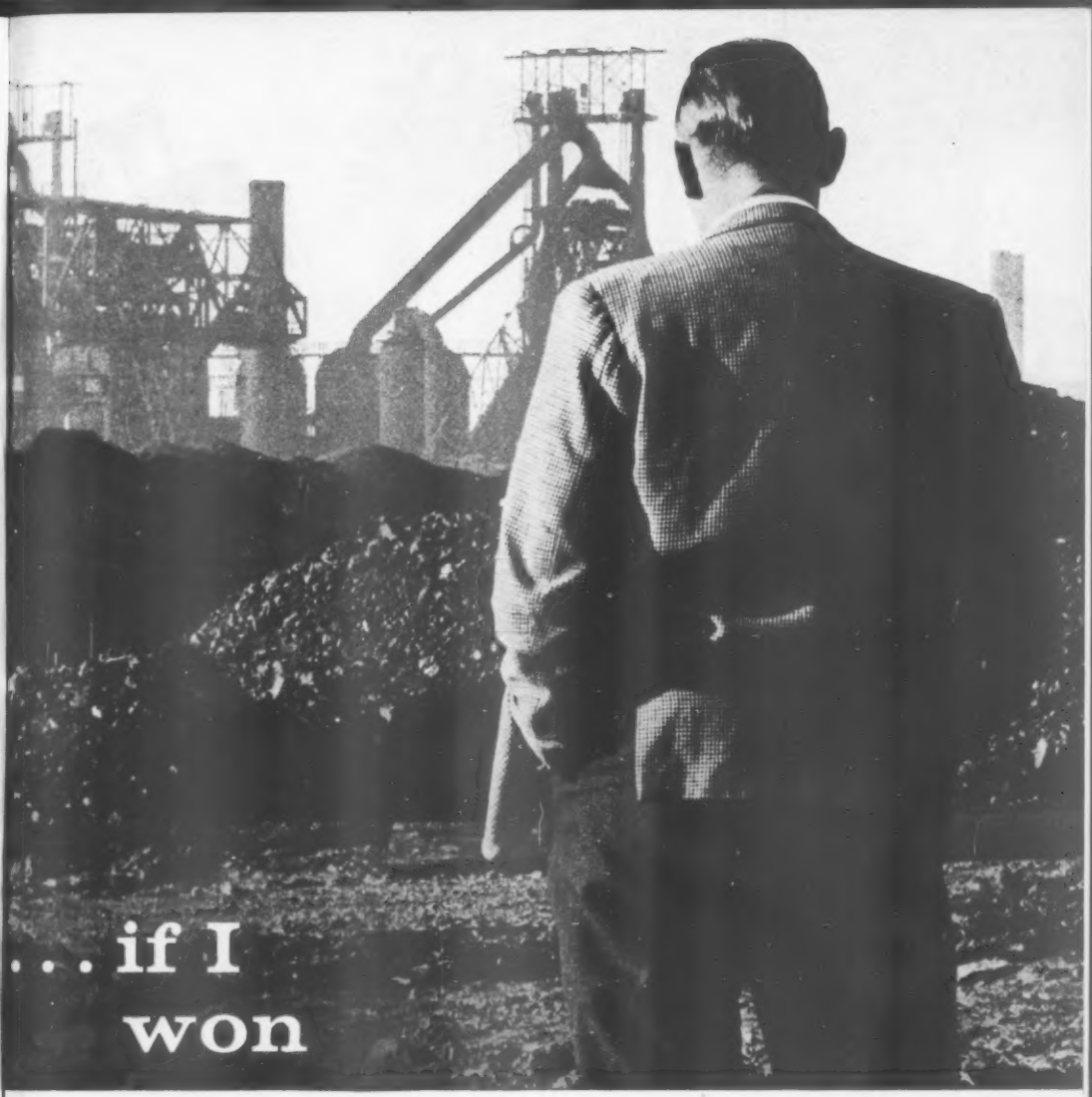

the pools

". . . and I might at that if a couple of teams I could mention were to buy themselves some decent centre forwards.

"Football is a funny game. One week a club is a world-beater and yet a few days later they can be licked to a frazzle by a team from a girls' school.

"Heaven help us if we carried on that sort of caper at AW. Customers don't want firms that are up one minute and down the next. When buyers come to a company with our reputation they expect—and get—a reliable performance. Fancy telling them that a load of pig wasn't up to specification because one of our furnacemen was off form!

"I reckon I'd get a coupon up every week if footballers were only half as consistent as the AW team."

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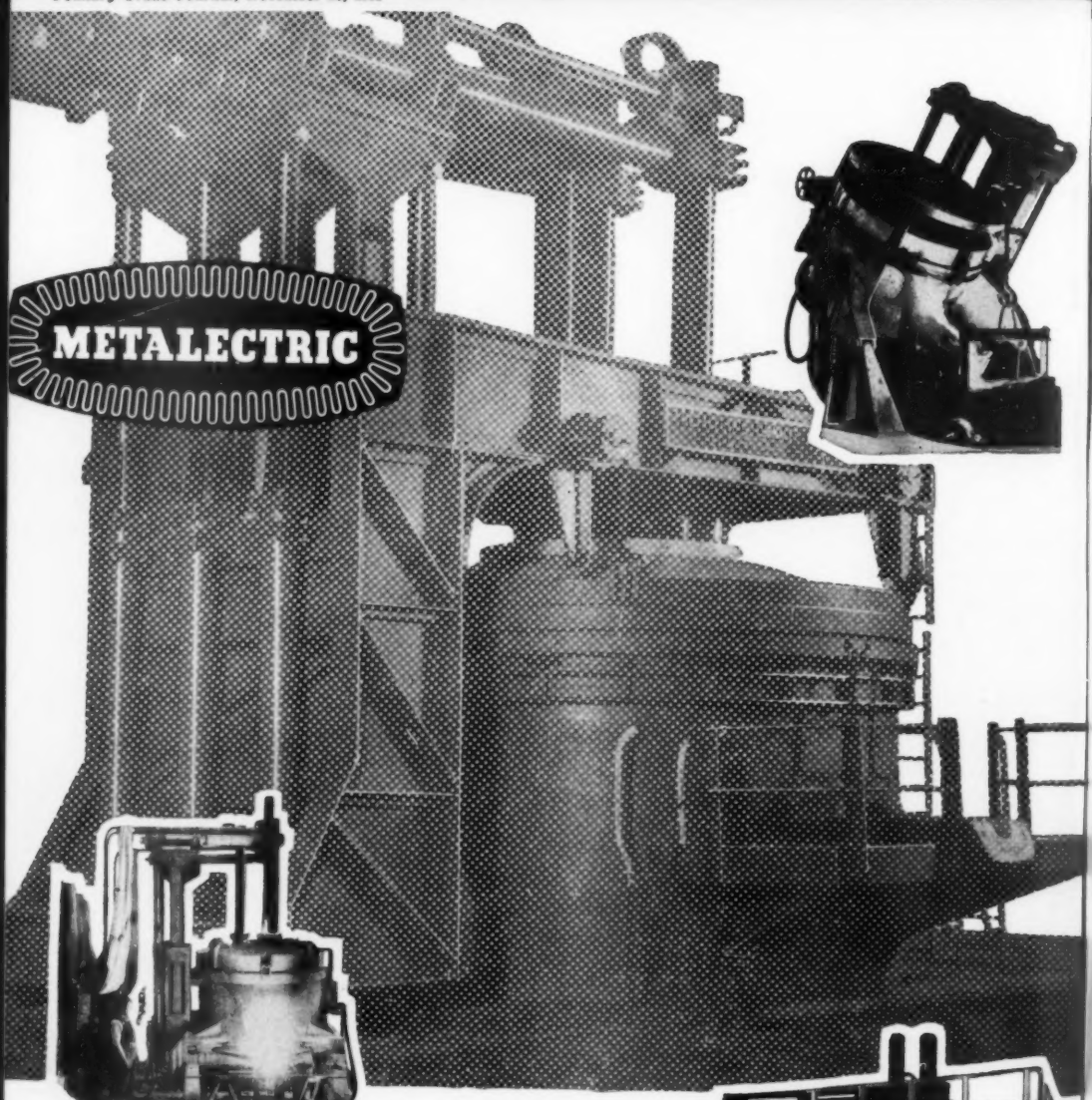

A comprehensive range of arc melters

Plant suitable for melting
superheating
refining
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Designs to suit nose tilt
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Charging by removable body
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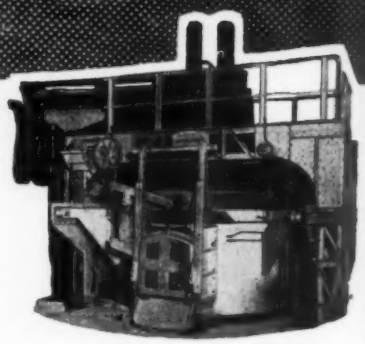
Capacity range 1 to 100 tons



25 years' experience in arc furnace design

METALECTRIC FURNACES LTD.

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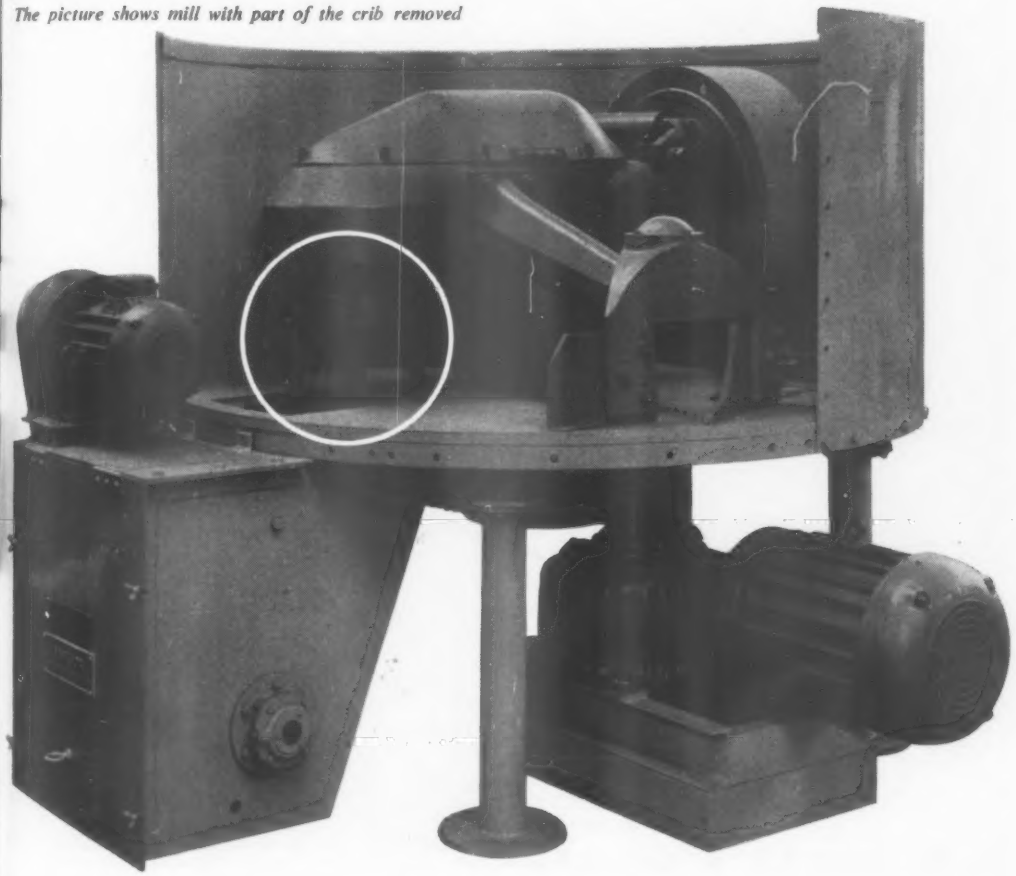
THIS NEW MIXING MILL, WITH THE POSITIVELY DRIVEN STIRRERS, IS ESPECIALLY SUITABLE FOR THE PREPARATION OF CO_2 SAND.

The picture shows mill with part of the crib removed



Built in England by

PNEULEC LIMITED, SMETHWICK, Nr. BIRMINGHAM

The most efficient wet type Spark Arresters are without doubt

Roper

Because Roper productions are more than efficient they are reliable in operation

Illustration on left, a Wet type Spark Arrester with Inspection Platform serving a 17 ton per hour Cupola.

At right is shown Spark and Dust Suppressor with a Spray Jet giving a double water curtain.

E. A. ROPER & CO. LTD

Photographs by courtesy of BILSTON FOUNDRIES LTD.

FOUNDRY EQUIPMENT ENGINEERS
KEIGHLEY YORKSHIRE
Tel: Keighley 4215/6 Grams: "Climax" Keighley

NEWSTAD *(Patented)*

Gas fired
Portable Mould Dryers

Incorporate full protection against gas or electric supply failure

Gas valve cuts off gas supply in case of pressure failure.

The ideal unit for drying moulds in situ.

Equally efficient for mechanised skin drying or moulds.

Air valve cuts off gas supply in case of electric supply failure.

Thermal output: 360,000 B.T.U's per hour or 500 cubic feet of hot air per minute at 400°. C Temperature range: 150° to 500° C.

Safe - efficient - clean - reliable

Rapid penetration of the sand gives quick drying and perfectly clean moulds.

Supplied only by the Foundry Drying Equipment Specialists.

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Specialists in FOUNDRY DRYING EQUIPMENT

BOOTH STREET, BIRMINGHAM 21. phone: SMEthwick 1591-2 grams: Mofustolim, B'ham 21

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COMMONWEALTH AGENTS

Forest Engineering (PTY.) Ltd. P.O. Box 6738 Johannesburg, South Africa. 8/219

The fastest method of cleaning castings!

AT
TILLING-STEVENS LTD.
MAIDSTONE

These pictures show that Tilling Stevens Ltd., of Maidstone know the most up-to-date and efficient method of removing sand and scale from castings. The components are cast iron suspension unit brackets for armoured fighting vehicles, and are blasted continuously on the rotary table in a 4 minute time cycle. The model shown is WMT4, just one of an extensive range which sets the highest standards yet known in abrasive cleaning. There are Wheelabrator Shot Blast Machines in types and sizes to suit all general applications, in addition to which much special plant has been designed to meet specific requirements.

TILGHMAN'S

ROTARY TABLE — AIRLESS

WHEELABRATOR

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TILGHMAN'S LIMITED

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SCOTLAND: Baibardie Limited, 227 Bath Street, GLASGOW, C.2
110 Hanover Street, EDINBURGH, 2.
NORTHERN IRELAND: Stewart, Industrial Services Ltd. 129, Ormeau Road, BELFAST

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FROM PART OF OUR ADVERTISEMENT IN THE NATIONAL PRESS IN 1959

Hoists supplied to FORD now exceed 400

STOP PRESS

ELEKTUS NOW MADE IN SIZES FROM 2 CWT UP TO 1 TON

VERROLEC
are proud of their association with FORD to whom they have supplied
300 ELEKTUS HOISTS*
as standard lifting equipment and have now again been chosen to provide ELEKTUS HOISTS for this newest project
* Lightweight heavy duty hoist
VERROLEC
provides the
UNUSUAL
FORD
VERROLEC LIMITED
721 North Circular Road,
Cricklewood London, N.W.2.
Telephone: GLAdstone 0623/4/5
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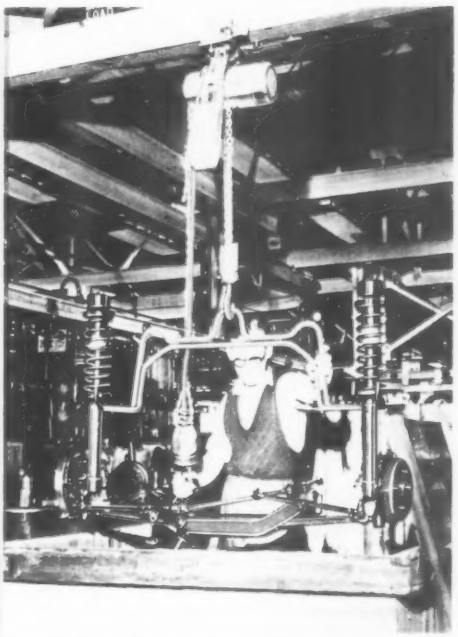
THE FORD STORY



We also supply:—

FOUNDRY MOULDING M/Cs. SHELL MOULDING M/Cs.

JOLTERS	VIBRATING SCREENS
SAND SLINGERS	SAND DRYERS
CORE BLOWERS	ANGLE GRINDERS

DOYLE 'POWER' RAIL FOR MOULD TRANSPORTERS
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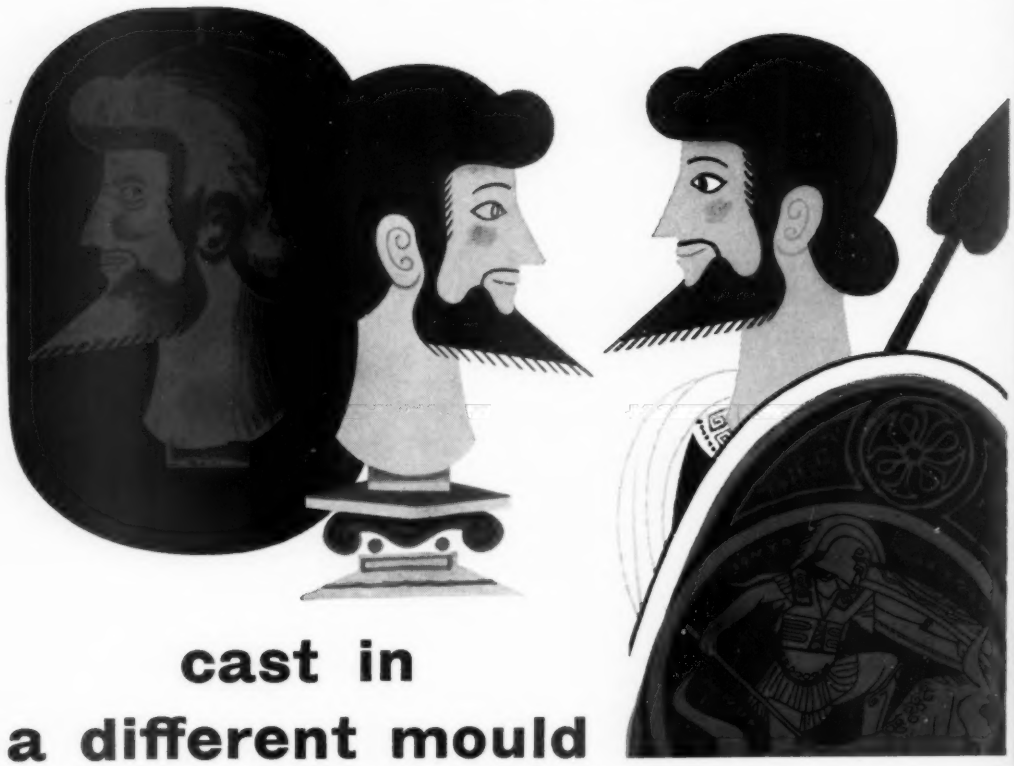


cast in a different mould

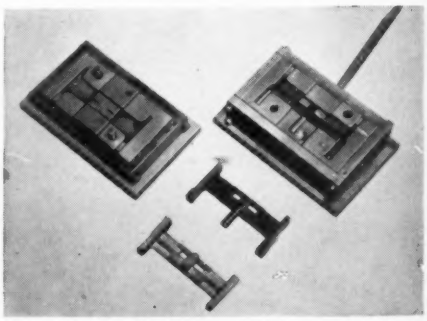
Dies for producing wax patterns are conventionally made of bismuth tin alloy. However, these tend to be costly in production and dimensionally unstable when cooling. That is why

TRUCAST LIMITED

decided to use Shell Chemical EPIKOTE resins for their wax injection dies. They realised that EPIKOTE resins would save time and money whilst giving superior performance all round . . .

The formulation based on EPIKOTE resins is half the cost of soft metal alloy; the number of man-hours during production is considerably reduced; dimensional stability is increased; greater abrasion and impact resistance give improved wear characteristics.

Here, as in many other applications, EPIKOTE resins have not only overcome initial production difficulties but now offer a constantly high standard of quality and performance.



SHELL

S.S.27.

EPIKOTE RESINS

SHELL CHEMICAL COMPANY LIMITED

Marlborough House, 15-17 Gt. Marlborough Street, London W1

YOU CAN BE SURE OF SHELL CHEMICALS

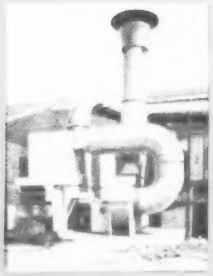
"SHELL" and "EPIKOTE" are Registered Trade Marks

Marks

NO

Is pust your droblem?

Mine was—and fume removal too, so I had a word with Spencer & Halstead. They examined the problem and installed one of their Spenstead Wet Type Dust Arresters. Presto the problem was solved.



Spenstead Wet Type Dust Arrester.

SPENSTEAD

For individual Dust Control Units or composite plant installation our advice is freely available. Remember we extract the DUST from inDUSTry.

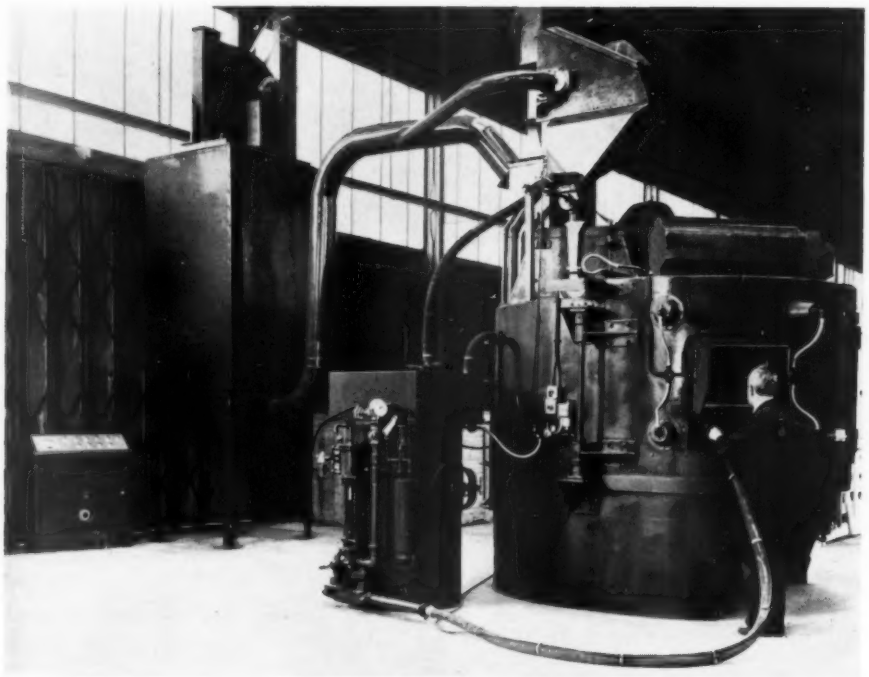
SPENCER & HALSTEAD LTD

We solved his problem — what about yours?

FAN ENGINEERING DIVISION · OSSETT · YORKSHIRE

HEPBURN CONVEYOR Co. Ltd.

WAKEFIELD



6' 0" dia. 'LK' Table Shot Blast Machine complete with Touch-up Unit together with Dust Collector.

Panqborn

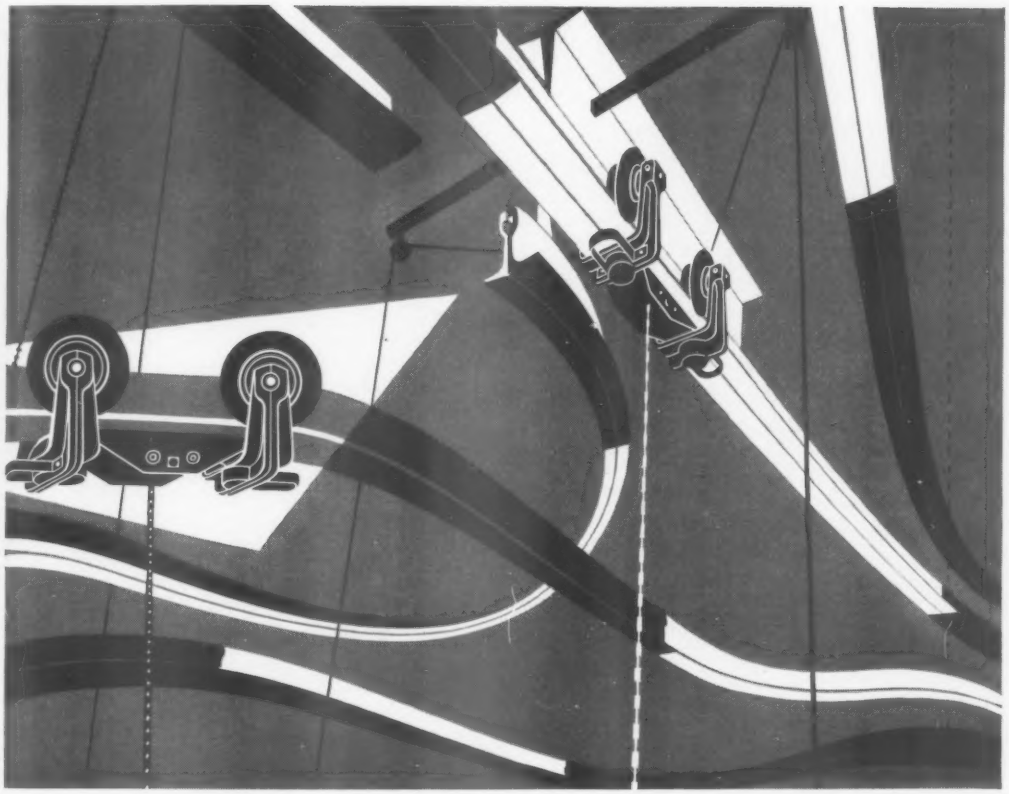
SHOT BLAST & DUST CONTROL EQUIPMENT

ALSO

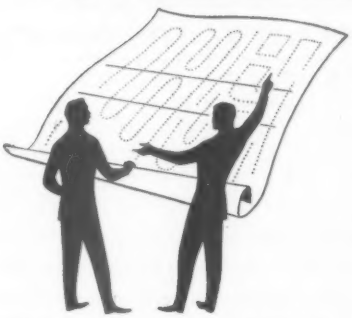
VIBRATORY FINISHING MACHINES

Telegrams
"CONVEYOR"

Tel Nos
3695, 6 & 7



OVERHEAD is the open road



After a survey of your plant, we produce a tailor-made plan. This and the estimate are free.

Whether simply transferring raw materials from unloading bays to stores, or routeing components at a pre-controlled rate along an involved production line, the MonoRail system allows unrestricted movement. It saves valuable floor space and permits transit over otherwise-congested areas. Each installation, from the smallest gravity drive to the most complex automated system, is individually tailored to your requirements.

Advantages worth noting □ Uses 'free space' for conveyance and storage □ Switches, interlocks and lifts permit movement in three dimensions □ Choice of individually powered, fully automated or gravity drives □ Can accommodate any number of items per transit □ Transit rates from 2-150 ft./min. □ Negligible operational and maintenance costs □ Underslung system permits unobstructed transfer between parallel tracks □ System can be extended as required □ Any size of installation □ Excellent after-sales service

Please write for information on our Underslung and Stacker cranes

send for the man with the MONORAIL plan

BRITISH MonoRail LIMITED

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Battery of Bogie Heat Treatment Furnaces: Electrically operated charging machine

MATHISON VERTICAL FLAME HIGH SPEED RECIRCULATING TYPE FURNACES

TEMPERATURE RANGE 0°C TO 1200°C

CLEAN GAS FIRED

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5 STAR FEATURES

- ★ Temperature uniformity ± 5°c
- ★ Maximum fuel economy
- ★ No flame impingement on stock
- ★ Automatic Pyrometric Programme Temperature Control
- ★ Rapid heat transmission by high speed recirculating gases for low temperatures and by radiation for high temperatures

Expert and prompt attention given to all enquiries

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Telephone Guisborough 59

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Central England

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WM Aske & CO LTD

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offering the technical experience of 56 years

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Telephone Halifax 60661/2 *Telegrams* BALTISEED Halifax

Another Polygram Installation at The English Electric Co. Ltd.

Photograph of a section of the Polygram Shell moulding equipment installed at the English Electric Company Limited, Bradford, Yorks.

Illustrations show a range of Shell Moulded Grey Iron Castings, previously produced by conventional sand moulding methods, on which substantial improvements and cost reductions have been made.

Any information you may require concerning the world famous range of precision built POLYGRAM Shell Moulding Machines and Equipment as supplied to principal foundries in Britain and the Commonwealth, The Ministry of Supply and the Crown Agents for oversea Governments and Administrations will be forwarded on request.

Photographs by courtesy of the English Electric Co., Ltd.

Polygram Casting Company have a competent and complete service to offer, and your enquiries are invited.

Polygram

THE FIRST NAME IN SHELL MOULDING

Polygram Casting Company Limited, Shernfold Park, Frant. Tunbridge Wells, Kent. Telephone: Frant 346 (5 lines.)

Fifteenth century carving in St. Leonard's Church, Ribbesford, of a pig playing the bagpipes, with a sow and litter, and two pigs reaching for acorns. Photograph by Ruth Meyler & F. C. Sillar

50 MILLION PIGS GO TO MARKET!

early days of the industrial revolution manufacturers ently looked for familiar and easily recognisable iptions of their products. To the countryman lanted into industrial surroundings nothing was familiar than a pig; a fact which is emphasised by gs in scores of old churches depicting pigs suckling litter, rooting for acorns and playing the bagpipes. rently this last pastime was forsworn by pigs many ago because of unpleasant associations between bagpipes and pigs bladders.) Consequently, when iron from Blast Furnaces was directed into long troughs and from there into short and narrow troughs placed at right angles, a resemblance to sows suckling their appendaged litter led to the description of 'pig iron'.

This series of advertisements illustrates some of the 'ecclesiastical' pigs and emphasises the 50,000,000 'special' pigs which Warner and Company have supplied to Iron Foundries producing High Duty Castings.

WARNER WARNER WARNER

"Pioneers of Refined Pig Iron"

WARNER & CO. LTD., MIDDLESBROUGH

FELCO
LIFTING APPLIANCES

TRIPLE GEAR CHAIN BLOCKS

SHORT HEAD-ROOM. Light weight. Compact and highly efficient. Capacities from 1 ton to 20 tons.

Sole Distributors For

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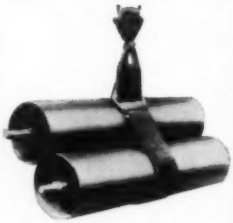
WIRE BELT SLINGS



THE SLING WITH 1,000 USES

The " Wedco " wire Belt Sling has the-strength of steel combined with maximum flexibility and a wide bearing surface giving exceptional load stability.
Made from thousands of strands of sturdy woven wire in a smooth transverse loop construction " Wedco " Wire Belt Slings cannot snap or tear. They are safer, easier to handle, faster to rig and will not whip, kink or tangle.
In the field of mechanical handling this is something you should know more about, write us for the fullest details.

RATCHET HOISTS

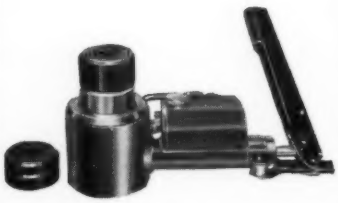
Incorporating a patented Overload Preventer giving greater security and safety to the operator, also reducing wear and saving cost of maintenance. A free - wheeling feature enables quick adjustment of unloaded chains.

BABY 60 ELECTRIC HOIST BLOCKS

BRITISH MADE. Patents Pending. 5 and 10 cwt. capacity. Light weight, compact and portable. Pushbutton control. Upper and lower overtravel limit switches. Supplied for any height of lift to suit requirements. Top hook suspension facilitates attachment to travelling trolleys or girder clamps, etc.

LOW LIFT JACKS

Large capacity for use in confined spaces. Swaying under load eliminated by large diameter providing easy adjustment of height. Capacities from 10 to 30 tons.



TRAVELLING CHAIN BLOCKS

Blocks built-in to Travelling Trolleys, giving reduced head - room. Capacities from 1 ton to 20 tons.

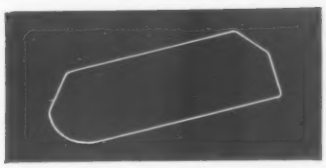
FELCO HOISTS LTD., 29 CROMWELL ROAD, SOUTH KENSINGTON, LONDON, S.W.7

Phone : KENSINGTON 7401 (3 lines) *'Grams: 'FELCOHOIST,' WESPHONE, LONDON*

F3/60

On your metal . . .

in



by

Park and Paterson Ltd.

INGOT MANUFACTURERS

The explorer . . . . the hunter, would never make anything of his endeavours unless he were at concert pitch a greater part of the time. Concert pitch is just how we would describe the tune of our organisation.

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GLASGOW
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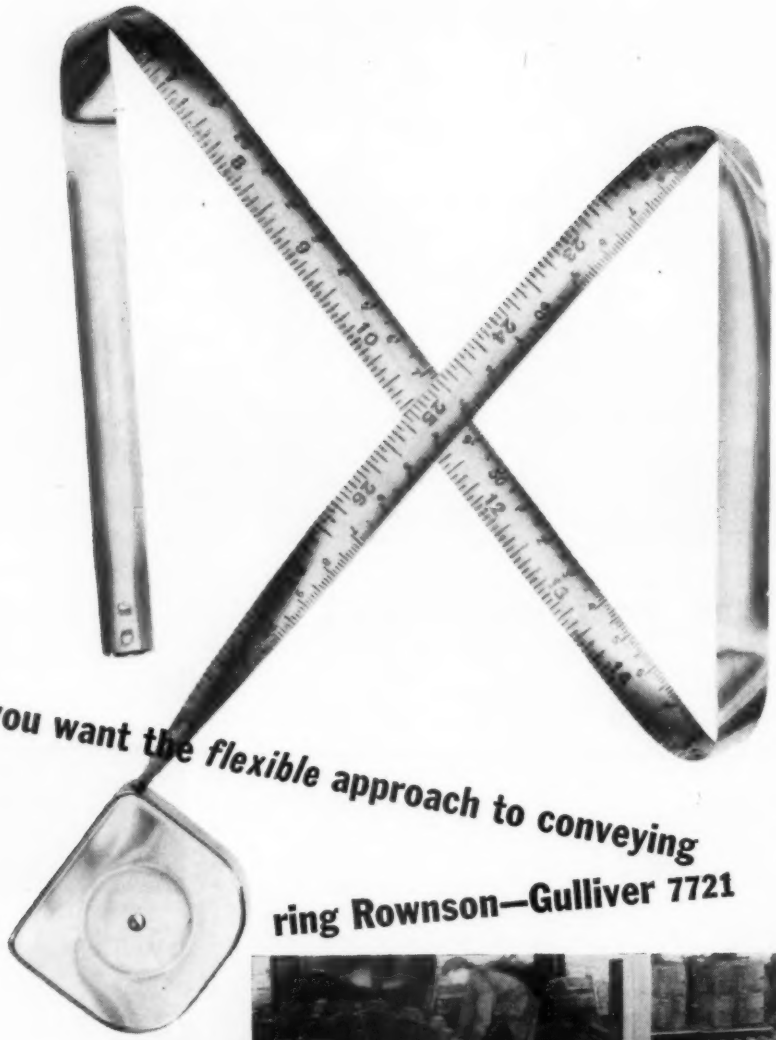
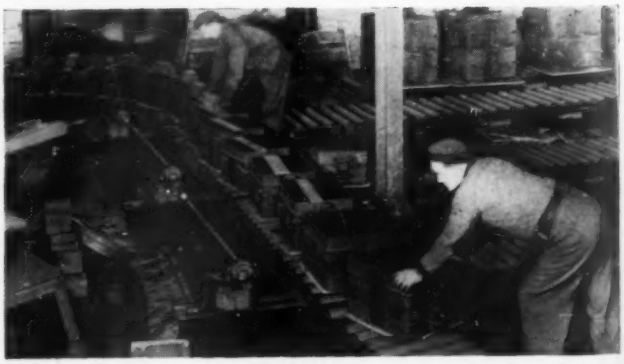


If you want the flexible approach to conveying

ring Rownson—Gulliver 7721



The types of conveyor Rownson supply are almost as diverse as the materials and goods they move so easily from one place to another. If you have a conveying problem that needs a flexible approach and a liveliness of outlook backed by diverse experience . . .

. . . let Rownson run the rule over it

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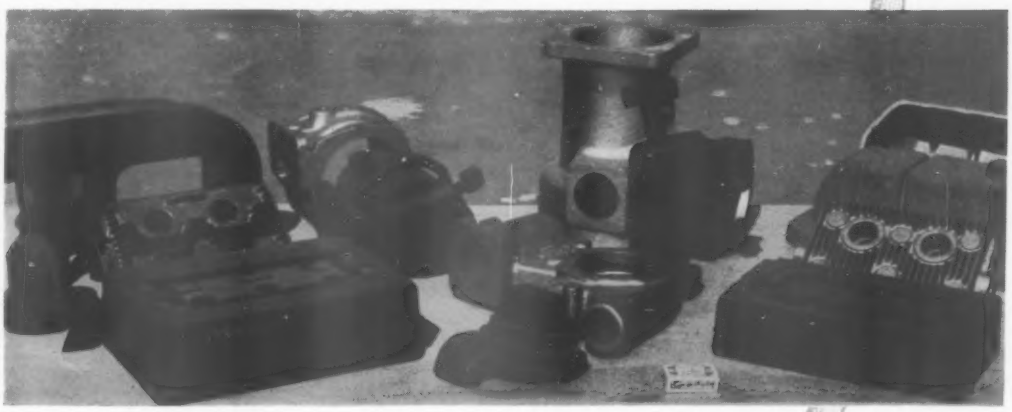
ROWNSON CONVEYORS LTD., Maiden Lane, York Way, London, N.7. Telephone: Gulliver 7721 Cables: Conveying, London

THE LOGICAL CHAIN OF EVENTS

Foundrol core oils

MORE AND MORE FOUNDRY MANAGERS
ARE TURNING TO FOUNDROL CORE OILS TO HELP
PRODUCE INTRICATE CORE ASSEMBLIES—



Group of iron castings and associated core assemblies
produced by WEST YORKSHIRE FOUNDRIES
LTD LEEDS using—

FOUNDROL C31A CORE OIL

better castings

HARMARK
FOUNDRY SUPPLIES

Manufactured by

HARBOROUGH CONSTRUCTION CO·LTD·MARKET HARBOROUGH

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Another Perfect Strip

Using "DURRANS" No. 10 Prepared Blacking

130 ton Ingot Mould is re-produced by kind permission of The Brightside Foundry & Engineering Co. Ltd.

STEELMOL *for STEEL and SPECIAL IRON CASTINGS*

HIGH CARBON BLACKING · CEYLON PLUMBAGO
TERRA FLAKE · COAL DUST · GANISTER AND
"ALUMISH" FOR ALUMINIUM Non-Silica PARTING POWDER

JAMES DURRANS & SONS LTD

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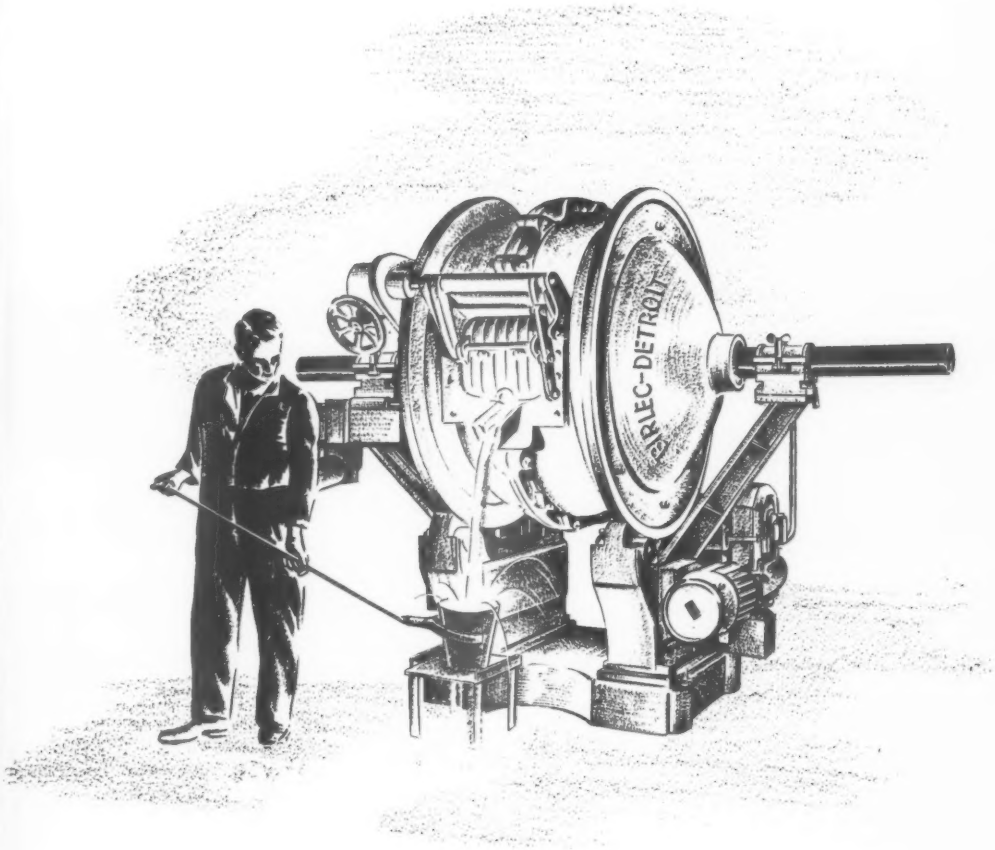

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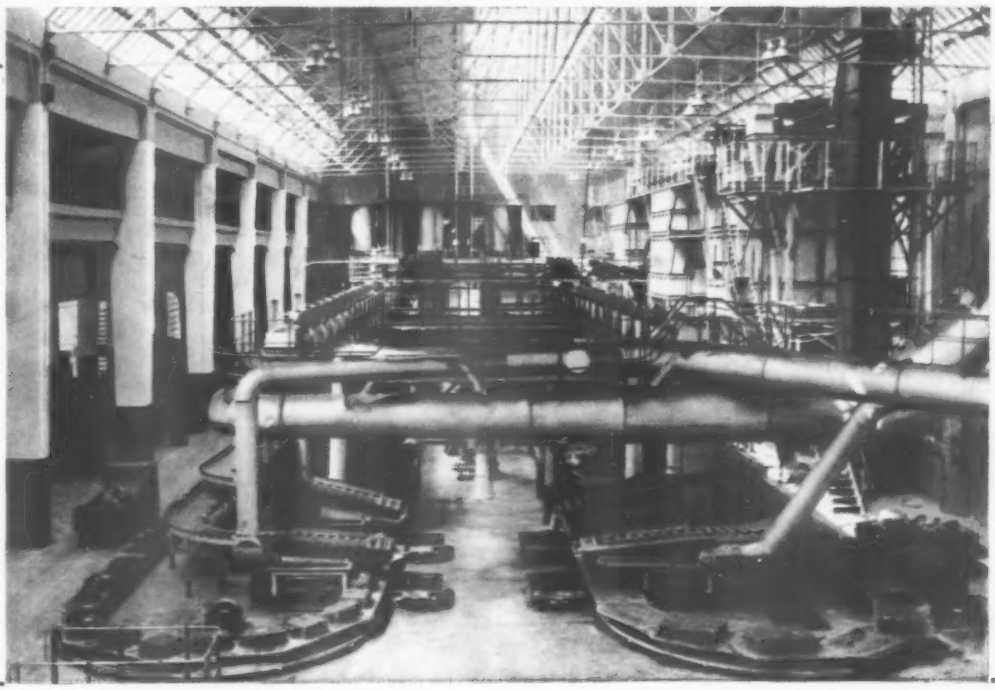

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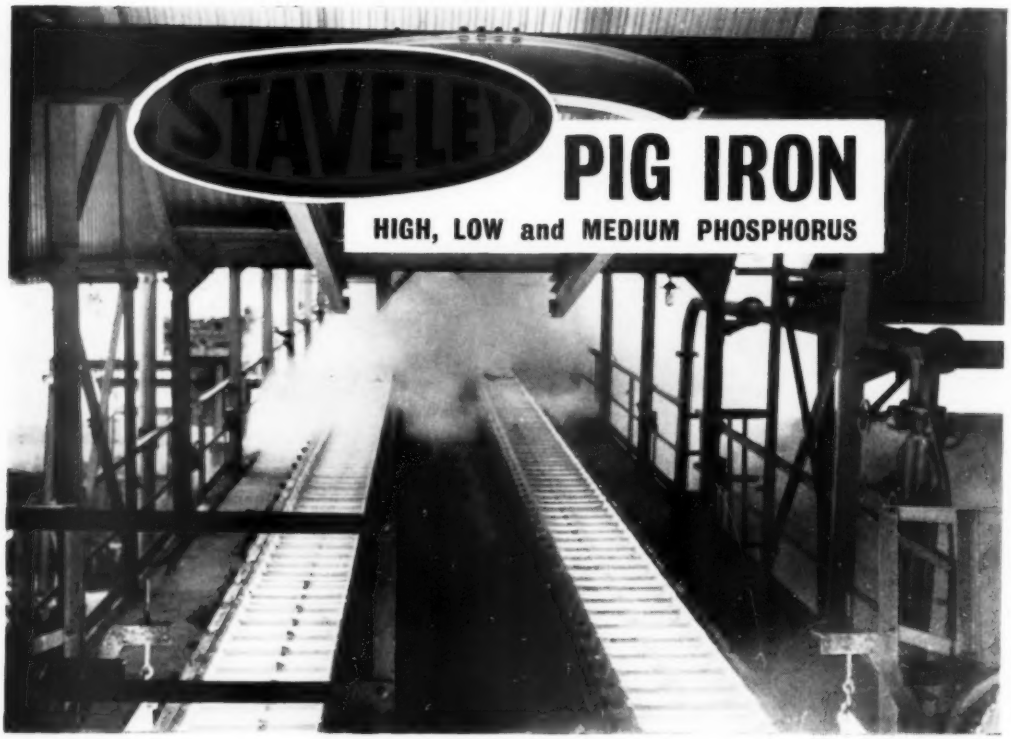

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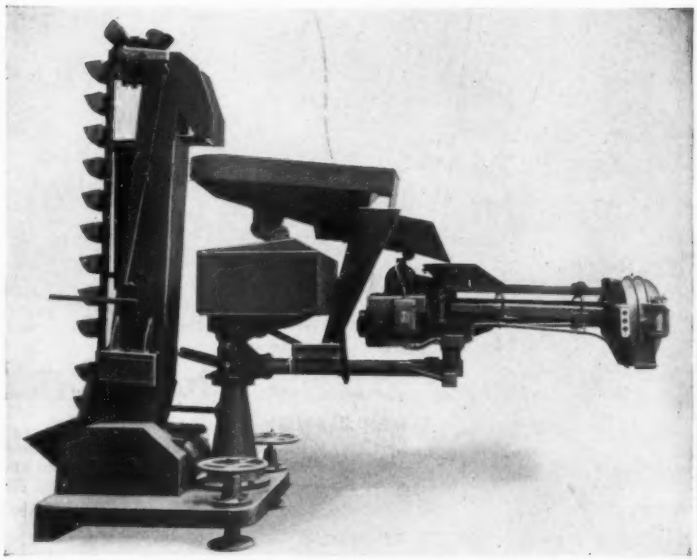

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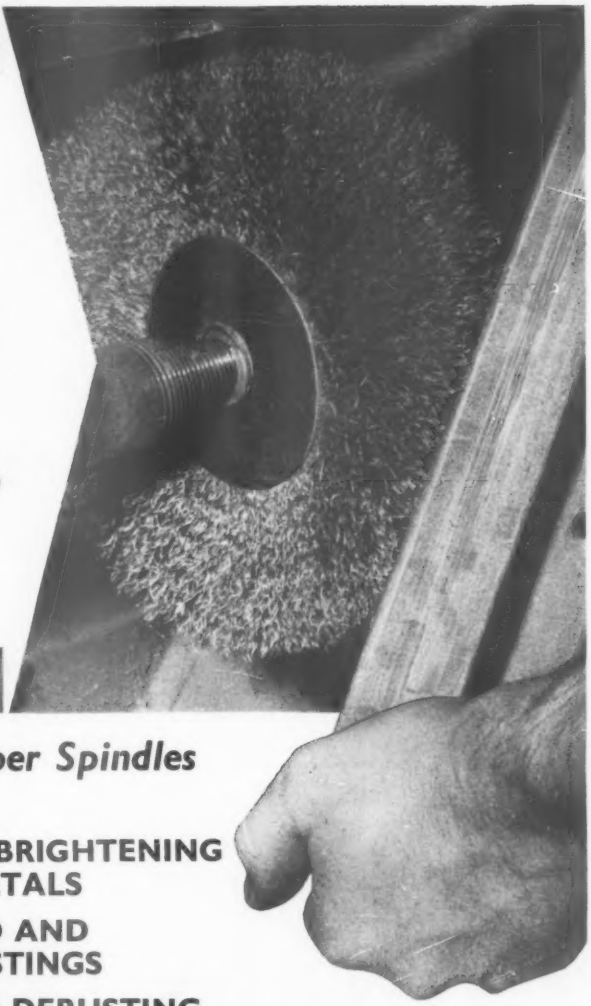

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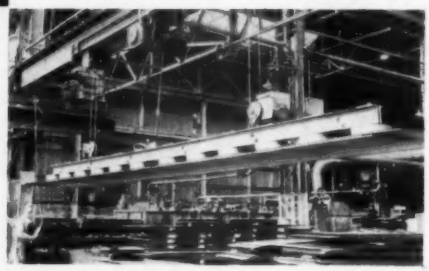

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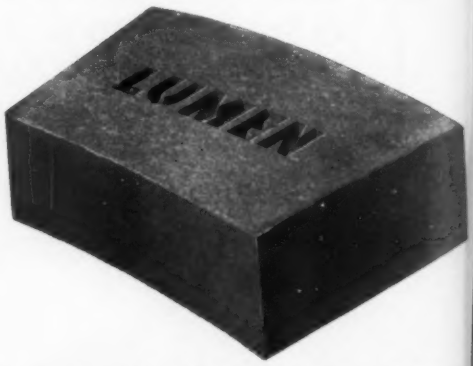

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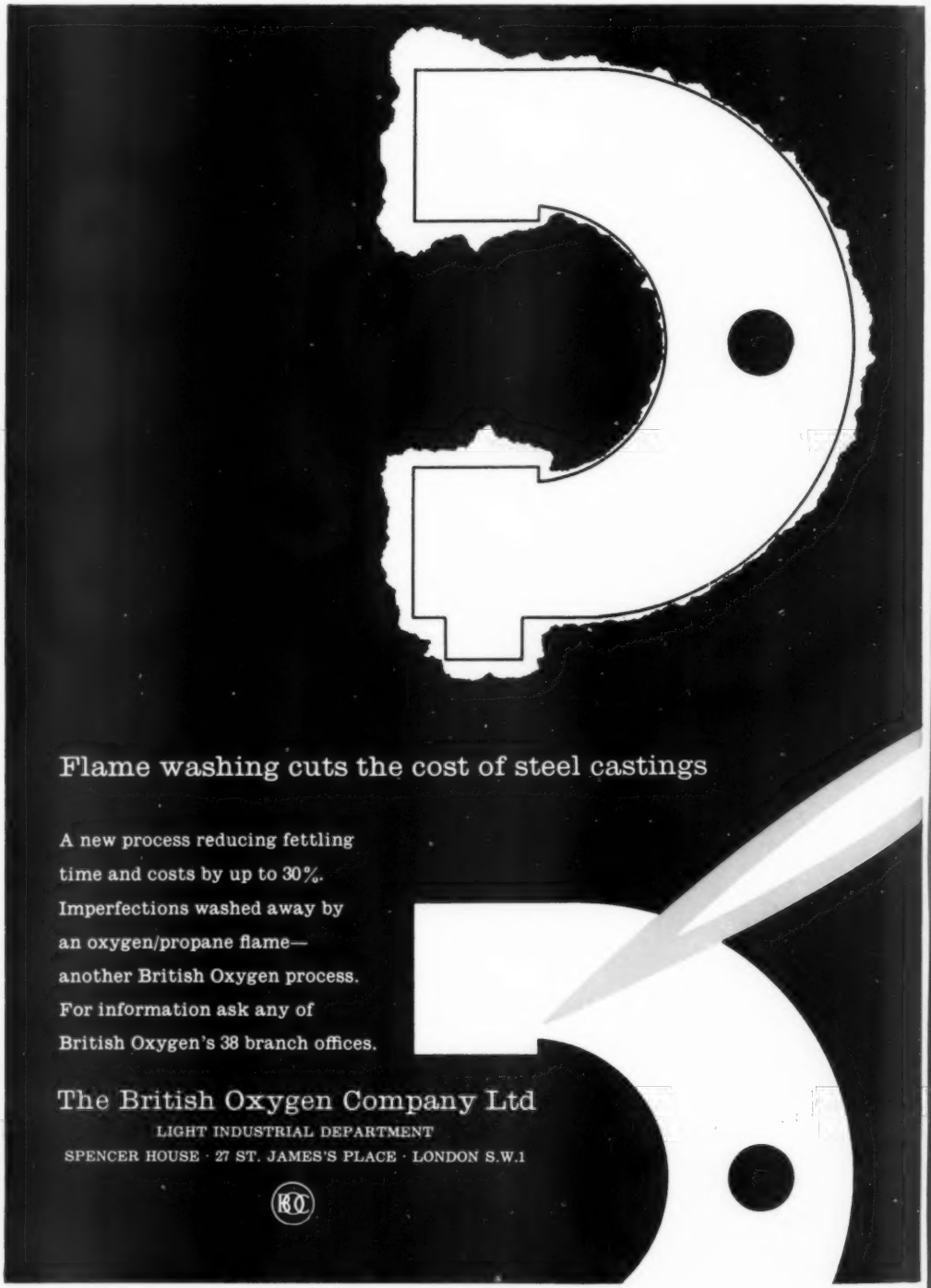
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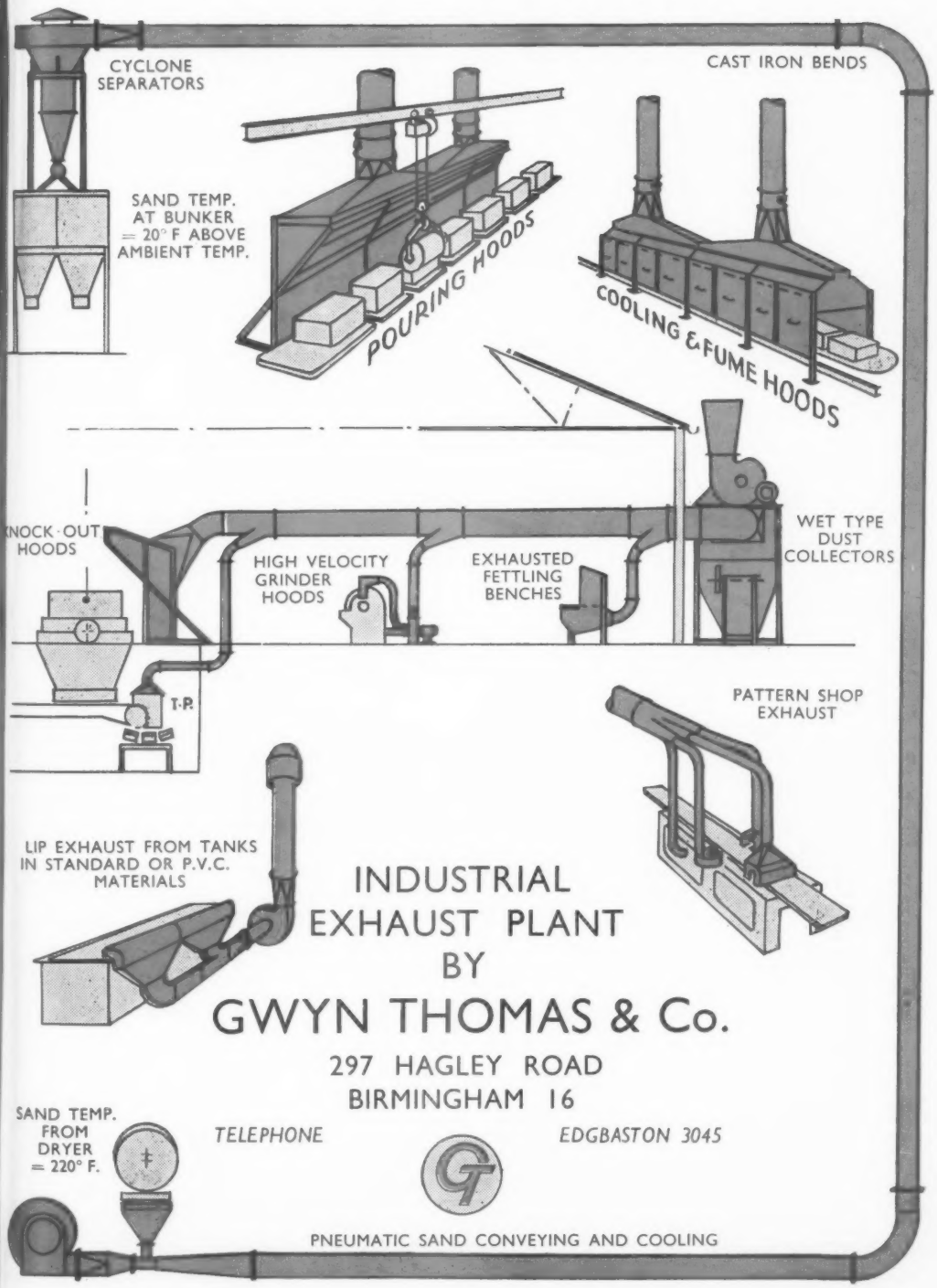
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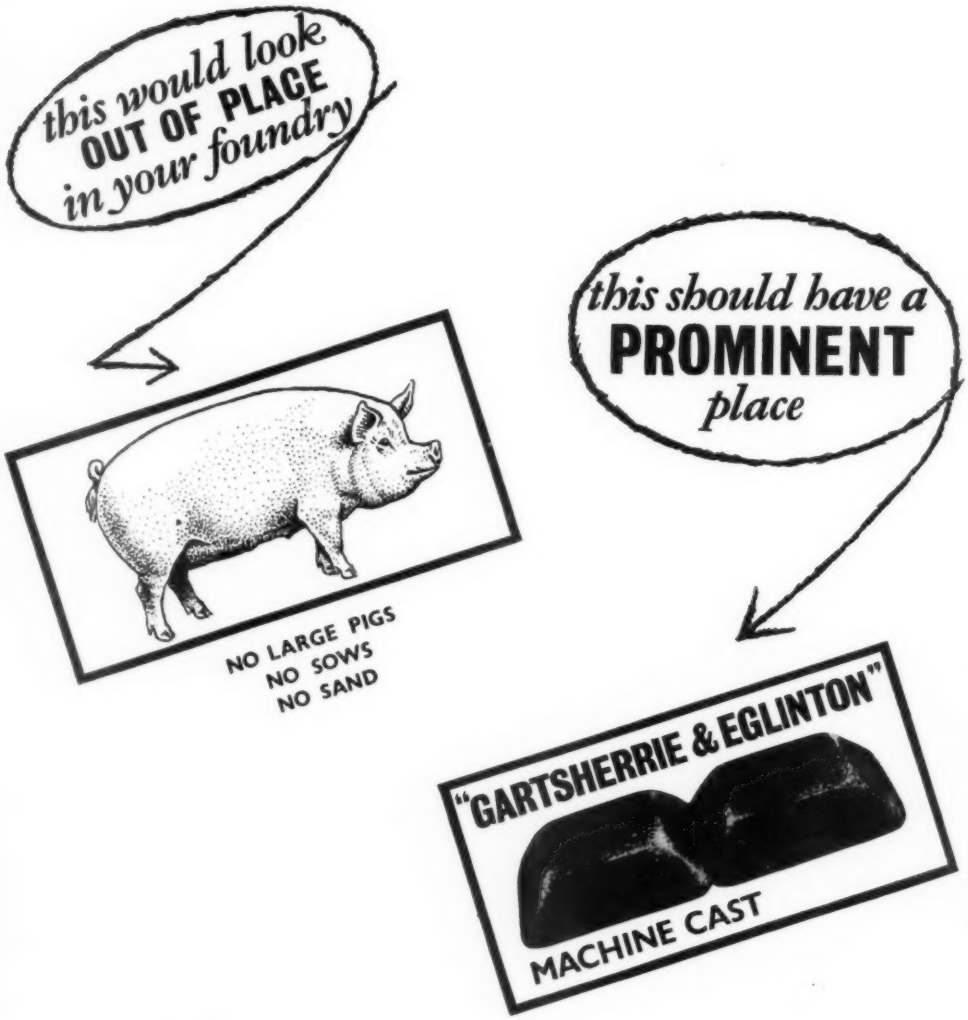

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Vol. 109 November 10, 1960 No. 2292

Established 1902

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IRON & STEEL TRADES JOURNAL

Published each Thursday

Annual subscription: United Kingdom 52s.
Abroad 60s. *Payable in advance*

Editorial Director:
V. C. FAULKNER, F.R.S.A., HON.M.I.B.F.

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Publisher: H. J. DWYER
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District Representatives:
G. P. ELLIOTT (Northern Area) 'phone: Altrincham 1334
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The FOUNDRY TRADE JOURNAL is the official organ of the British Steel Founders' Association; Association of Bronze & Brass Founders; the Light Metal Founders Association; Foundry Trades' Equipment & Supplies Association and the National Society of Master Patternmakers.

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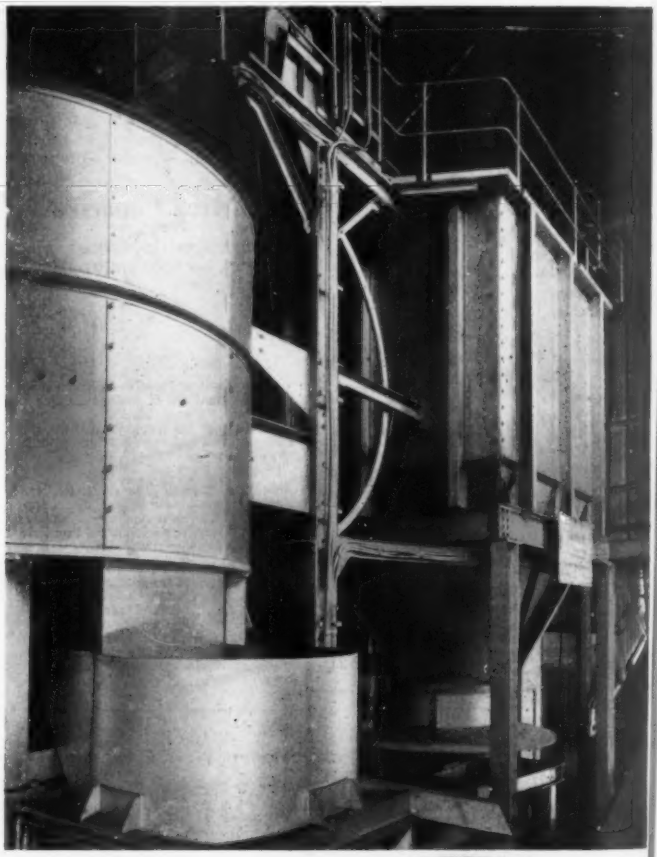

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Training Pamphlets

The Ministry of Labour from time to time issue recruitment pamphlets covering a wide variety of trades. Many are quite interesting, but viewed from the angle of a boy who can be fascinated by the idea of driving a steam locomotive, they are deadly dull. Those issued by the foundry industry compare very favourably with the general run. Many of them, however, fall between two stools—appeals to the parents and the boy. In the writer's opinion, the best pamphlet ever produced was by the Meehanite group introducing the potentialities of their training centre at Butterley. This, addressed to the boy, after a short preamble read: "Then you take the train to Ripley where you will be met by your instructor who will take you to your lodgings," and so forth. Here a word picture was painted of a definite character, a procedure which undoubtedly made an immediate impression on the mind of any boy who had a slight flair for adventure.

The latest pamphlet to be received of this type is one issued by the Institution of Metallurgists. It is specifically addressed to scientific sixth-form schoolboys, yet the language used would probably merit attention from students of English. For example, the sentence reading: "And in this sense it is something of a renaissance discipline of the modern age, offering to the able and curious the freedom and scope of disinterested scientific inquiry, equally with the satisfaction to be gained in solving the technological problems of making metals better fitted for the demand now made upon them," would be about as difficult to parse and analyse as some of those quotations from Milton which harassed the brain of the Victorian schoolboy. There seems to be no beginning, no message and no inspiration to the sentence and the same, unfortunately, could be said of the whole pamphlet, despite its laudable aim.

The American Foundry Educational Foundation has tackled this problem so far as their industry is concerned in quite a different manner. The system is to wait until their sixth-formers have started their first year of chemistry, physics and mathematics and then members of the Foundation personally visit the technological institute or university and invite the student to spend his vacation in an appropriate foundry. Here, individual manufacturers, after an appraisal of likely men, usually make an appeal to those approaching graduation to join their staff.

Foundry Trades Equipment and Supplies Association

Annual General Meeting

The annual general meeting of the Foundry Trades Equipment and Supplies Association was held at the Waldorf Hotel, London, W.C.2, last Thursday. Mr. Gavin C. Paterson presided. He opened the meeting by referring to the sad loss the Association had suffered through the death of Mr. Barrington Hooper, C.B.E., and the meeting paid a silent tribute to his memory.

At the luncheon which preceded the meeting he presented badges to all the past-presidents, except Mr. V. C. Faulkner who had held one since 1927. Because there was no change in the membership of the Council, that morning the meeting had elected Mr. W. E. Aske as president, Mr. R. Sutcliffe as first, and Mr. V. L. Cashmore as second vice-president. After the minutes of the last annual general meeting and balance sheet of the Association had been passed, the meeting went on to consider the annual report which is reproduced below:

Membership

During the year 1959, five new members were elected and there were three resignations, making a total of 90 members at December 31, 1959. The Association gained considerable prestige by the success of the foundry exhibition held in May, 1959, and this is apparent by the increasing number of inquiries received from potential buyers and other organizations connected with the founding industry. The Council wish to impress upon members the importance of making full use of the services of the Association.

Accounts

The Accounts of the Association for the year ended December 31, 1959, showed a deficit of £539 10s. 0d. In anticipating this it was agreed at the annual general meeting in October, 1959, that the subscription payable by individual members be increased to 20 guineas, and this became effective for the year 1960.

Council

The Council held 11 meetings during the year under review. By means of circulars members have been informed of the various matters of interest and their views have been sought on certain subjects concerning the policy of the Association.

Handbook Committee

The handbook committee, under the chairmanship of Mr. W. Rawlinson, held preliminary discussions in regard to the preparation of the fourth edition of the Association's handbook. It had previously been decided by members that the next edition should be published in 1962 and a more comprehensive report on developments will be given to members at the annual general meeting.

Exhibition Committee

Further meetings of the exhibition committee took place following the conclusion of the foundry exhibition held in May, 1959, these being for the purpose of finalizing the various matters requiring attention. The surplus arising from the exhibition was distributed to those members who participated, the refunds being calculated *pro rata* to the individual amounts paid for space rental. In accordance with the decision of members, a booking has been made for Bingley Hall, Birmingham, for the next foundry exhibition, from April 29 to June 1, 1963, the exhibition being open from Thursday, May 16 to Saturday, May 25, both dates inclusive. A new exhibition committee, under the chairmanship of Mr. R. Sutcliffe, has been formed to deal with the organization and arrangements for the next exhibition.

National Union of Manufacturers

Mr. C. Orton Foster has continued to serve as the Association's representative on the Executive Council of the NUM. Those companies who are interested in membership are reminded that they are entitled to a rebate of 20 per cent. off their annual subscription to that organization.

Institute of British Foundrymen

Thirty members of the Association contributed a total of £277 towards the expenses of the 1959 conference of the Institute of British Foundrymen.

Clean Air Act, 1956

In the interests of the members concerned, the Association co-operated with the Joint Iron Council on the question of dealing with emissions from hot-blast cupolas as required by the Act.

Association Dinner

The Council wishes to record its appreciation to the committee for the success of the annual dinner which took place at the Savoy Hotel in 1959. It was pleasing to note that the attendance exceeded that of the previous year and this was almost double in 1960.

(The Report is signed by Mr. Gavin C. Paterson, president, and Peat, Marwick, Mitchell & Company, the secretaries.)

The meeting then discussed the proposed handbook and arrangements for the 1963 foundry exhibition. Mr. Paterson made a plea for increased support of the fund to rebuild and equip the National Foundry Craft Training Centre. The meeting terminated with a vote of thanks, proposed by Mr. Aske to the president, for the excellent work he had carried out during his two-year period of office, which included the running of last year's exhibition.

Dinner

INSTITUTION OF PRODUCTION ENGINEERS

The annual dinner of the Institution of Production Engineers was held at the Dorchester Hotel, London, on November 2, under the chairmanship of Mr. G. Ronald Pryor, president of the Institution. The guest of honour was the Rt. Hon. Lord Piercy, C.B.E., president of the National Institute of Industrial Psychology and of the Institution of Works Managers. Accompanying Mr. Pryor and Lord Piercy at the top table were Mr. M. I. Botha, Assistant High Commissioner for South Africa; Mr. H. Burke, vice-president of the Institution; Sir George Dowty, president, Society of British Aircraft Constructors; the Rt. Worshipful the Mayor of Westminster, Councillor R. L. Everest, J.P.; H.E. Rt. Hon. Sir Eric Harrison, K.C.V.O., High Commissioner for Australia, Mr. E. J. Hill, chairman, TUC; Sir H. D. MacLaren, president, Institution of Electrical Engineers; Sir W. Puckey, past-president IPE; Mr. W. S. Risk, president, Institute of Cost and Works Accountants; Lord Sempill, A.F.C., past-president IPE; Sir William Stanier, F.R.S., D.SC., president, Production Engineering Research Association; Sir William Strath, K.C.B., Permanent Secretary, Ministry of Aviation; Sir Basil Tangye, BT., chairman of Council, Production Engineering Research Association and Sir William Wood, J.P.

Electrically-heated Elevator Furnaces For Annealing Blackheart-malleable Castings

*By J. M. Paton**

The adoption of electric power for the heating of foundry melting and treatment furnaces has gained impetus from the enactment of recent legislation designed to improve working conditions inside and in the neighbourhood around foundries. Electric annealing for malleable castings is now 10 years old and it is germane, therefore, to consider the practical working out of this process. The following account has been prepared from data collected by the Author and deals in turn with a number of notable foundry installations. The theme is one of successful adaptations of an old process to the new power source.

The operation of the first British installation of electrically-heated elevator furnaces for annealing blackheart-malleable castings, that at Gloucester Foundry, Limited, was described by Mr. P. F. Hancock in the FOUNDRY TRADE JOURNAL on December 10, 1953. Designed and built by Birlec, Limited, these furnaces have given consistently good service and have now been in operation for between eight and nine years. Since then, three additional works have had plant of this kind, two pairs of larger furnaces having been put in at Ley's Malleable Castings Company, Limited, Derby, one pair of less charge-capacity than the original at the foundry of H. W. Lindop & Sons, Limited, Walsall, and a further pair of furnaces of the largest size at the works of Crane, Limited, Ipswich.

The purpose of the present article is to describe the later furnaces and their performance, but first of all it may be desirable to recapitulate the general features of the furnaces and the cycle adopted for correct annealing-conditions.

Description of Furnaces

A single installation comprises a high-temperature furnace, a low-temperature furnace and three movable bogie-hearths, arranged for operation together on what is generally termed the "two-furnace system." The furnaces are of the elevator type, chosen because of the facility with which gas tightness can be established and maintained, which is essential for good annealing. In this design, the furnace casing is mounted on a structure, arranged so that a loaded bogie-hearth can run underneath, the bogie being raised by a built-in hoist to close the bottom opening of the furnace, where a sand-filled sealing-trough engages with a projecting skirt to seal the furnace. The arrangement of furnaces with bogies is indicated in Fig. 1.

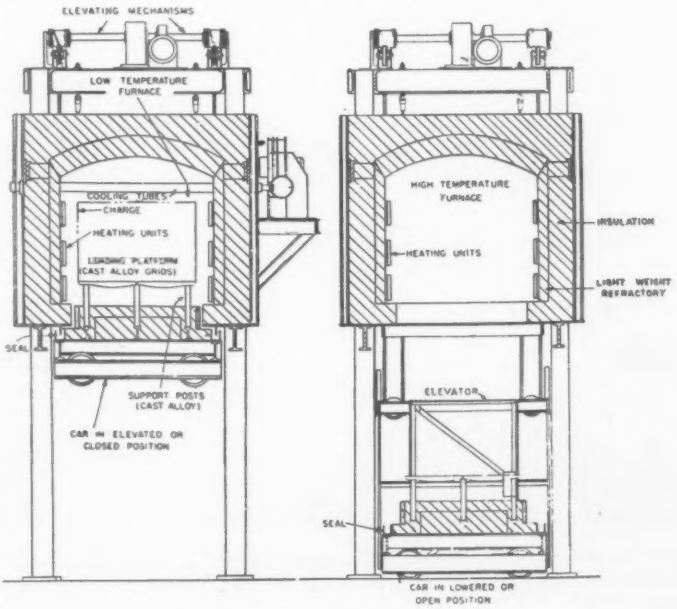

FIG. 1.—*Diagrammatic view of a pair of furnaces—the one high-temperature, and the other low-temperature—for annealing Blackheart-malleable.*

* The Author is manager of the special Furnace Department of AEI-Birlec. Limited to whom acknowledgment is made for use of the photographs.

Electrically-heated Elevator Furnaces

Cycle

The total annealing time is generally 48 hours and the time-temperature cycle is shown in Fig. 2. Part (A) is the pre-heating stage, part of which from 300 to 600 deg. C. must be comparatively slow and is carried out in the low-temperature furnace. The second part (B) completes the initial heating to 950 deg. C. and the soak at this temperature, the high-temperature furnace being used for this stage. Part (C) comprises cooling to and equalization at 760 deg. C., followed by slow cooling to about 700 deg. C. and then rapid cooling to a discharge temperature of 550 to 600 deg. C.; this is dealt with by the low-temperature furnace. Variations of this cycle are employed in special cases, but it is very desirable to be able to use the 48-hr. period, first, because both furnaces are each used for half the time and there is no idle time; second, the bogie changeover-times can be chosen so that the heating period for a fresh charge can take place overnight, when electricity maximum demand in the factory is otherwise low, with consequent economy in power cost; and third, with the chosen changeover times, an annealed charge comes from the low-temperature furnace at a time when it can cool overnight for unloading and reloading of the bogie during day-shift hours. In addition, it will be seen that there is considerable advantage in having a regular sequence of operation, and a bogie-load discharged and available for despatch to customers every 24 hours.

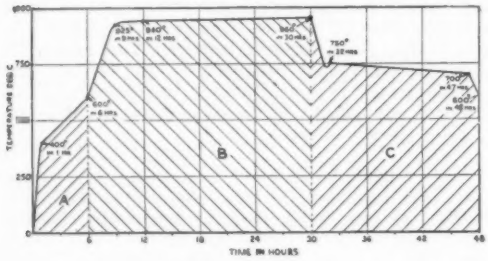

FIG. 2.—*Annealing cycle, showing the three phases: (a) Preheating; (b) high-temperature soak; (c) cooling.*

Ley's Malleable Castings Company, Limited, Installation

The two pairs of furnaces (Fig. 3) in the plant installed at Ley's Malleable Castings Company, Limited, have been in operation since early in 1955. The high-temperature and low-temperature furnaces are rated respectively at 880 kw and 600 kw and each bogie-hearth has a charge space of 22 ft. by 6 ft. by 4 ft. 4½ in. The castings are loaded

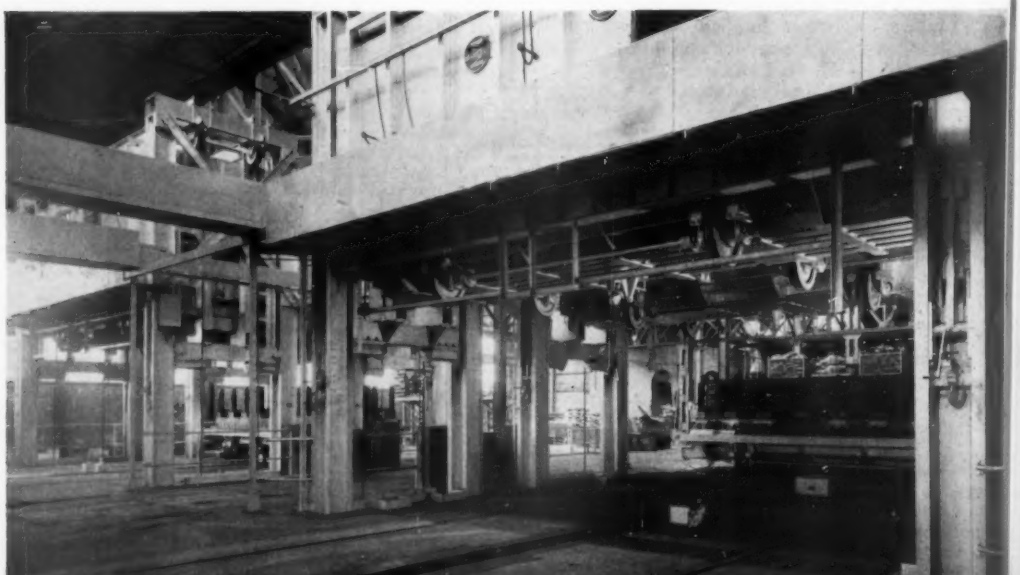

FIG. 3.—*Two pairs of elevator furnaces for the gaseous annealing of blackheart malleable castings, installed at Leys Malleable Castings Company, Limited. These furnaces are rated at* 880 *kw and* 600 *kw respectively.*

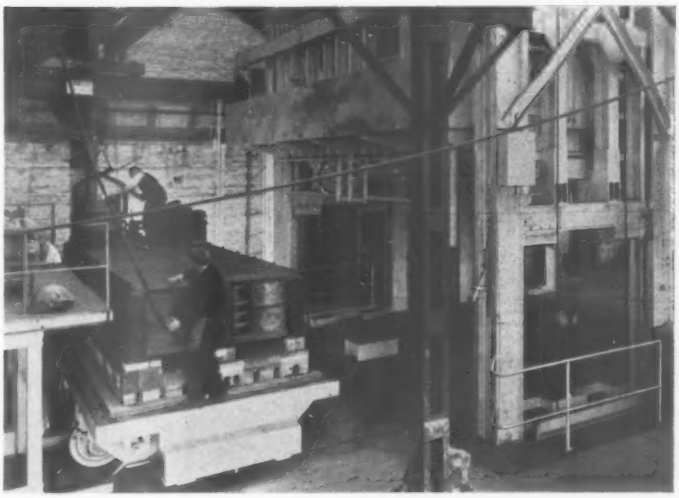

FIG. 4.—*One pair of vertical batch elevator furnaces installed at Leys Malleable Castings Company, Limited. This view shows the method of loading the charge on the bogie.*

in two tiers, the smaller ones in old oil-drums and the larger packed round the drums, the total net-charge usually being between 16 and 18 tons. The castings produced are of very great variety, but the bulk are for the automobile and agricultural-implement trades. They vary from a few ounces up to one cwt. or more, and up to ¾ to 1 in. section. In the case of castings of section greater than ½ in., the material is treated with boron to increase annealability.

Operation

A bogie (Fig. 4) is unloaded and reloaded in less than nine hours, day-shift labour being used entirely. Two men are employed full-time and another part-time, the cost being very low at 1.3 man-hours per ton unloaded and loaded. The castings are, of course, brought up to the point at which the men are working and taken away afterwards by mechanical transport. The power consumption varies between 380 and 400 kwh per ton, the higher figure being accounted for by the use of a longer cycle for some charges.

The cost of maintenance has been very low, the furnaces and electrical gear requiring only a minimum of routine attention. The bogies need some work on them, but major expense has been avoided by doing any small repairs which are required, each time a bogie is being unloaded and reloaded. No production time has been lost by breakdown.

At Ley's Malleable, it has always been the practice to straighten all castings and this has continued with the advent of the electric furnaces, but with the latter, distortion is certainly no worse than with the pack method of annealing. The oil drums used to accommodate the smaller castings are generally bought second-hand for a few shillings and last 10 to 12 treatments so that the cost is practically negligible.

Nickel-chromium grid castings support the charge in two tiers, the top one on vertical malleable-iron supports which are cast in the foundry. The latter have a life of some six months and the grids at least four to five years. Many of the originals are still in service and all that has been done to them is to weld up any cracks which appear from time to time.

As far as cost is concerned, it is reported that electric annealing is achieved at a direct cost of about 75 per cent. of that incurred with powdered-coal firing. This cannot take into account factors such as cleanliness and better conditions for workpeople. Further, the castings themselves require a minimum of cleaning, and it is stated that the product is more uniform.

Equipment at H. W. Lindop & Sons, Limited

At H. W. Lindop & Sons, Limited, there is one pair of furnaces started up in 1955, which replace all the furnaces originally at the main foundry. The high-temperature and low-temperature (Fig. 5) furnaces are rated 350 and 200 kw. respectively, each bogie having a charge space of 11ft. 6in. and 5 ft. by 3 ft. 6 in. loaded in a single tier. The total nett-charge is 7 to 7½ ton, supported in the same way as in the case of the larger furnaces. The weight range is from a few ounces up to two to three cwt. Sections up to 1 in. are entirely satisfactory with one annealing cycle, but some thicker ones have to be put through twice. Some additions to the metal before casting increase the annealability of the material where thick sections are concerned.

Operation

Day-shift work only is involved and each bogie is dealt with in one day by two men, plus one other man with a fork-lift truck for about three hours per-day. This works out at much the same man-hour figure as the other installation, being a little over one man-hour per ton loaded and unloaded, against two men-hours per ton by the old method. Using the standard 48-hr. cycle, the power consumption is 400 to 420 kwh. per ton. There has been no significant maintenance (other than routine) so far, apart from replacement of some elements in the h.-t. furnace. Here also, attention is given to the bogie brickwork when exposed before reloading.

Only those castings which must be straightened are dealt with and the total amount of straightening in the output is stated to be no more than with the former pack-method of annealing. At Lindops, the number of oil drums used is somewhat

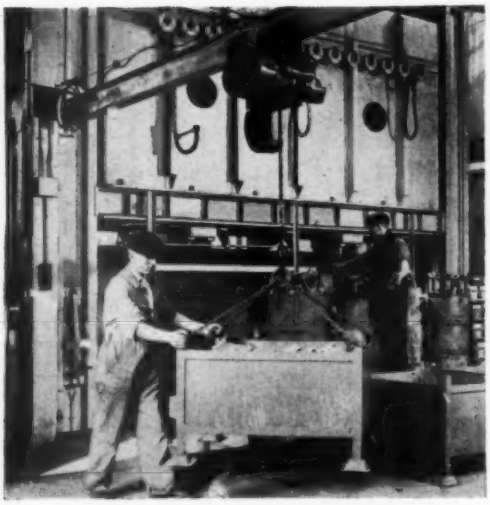

FIG. 5.—*This elevator-type furnace, rated at 200 kw, is used for low temperature annealing of blackheart malleable castings, and is installed at the Walsall Foundry of H. W. Lindop & Sons.*

greater, each lasting about three treatments only, but even so, the cost per ton of castings annealed is only counted in pence. The nickel-chromium grids have a life in excess of four years, cracks being welded when necessary.

The quality of casting produced is stated to be more than equal to that previously obtained, as far as the metallurgical aspect is concerned. The product is cleaner than before and there is less skin trouble. Moreover, it is possible to eliminate the shotblasting of up to 75 per cent. of the castings.

Savings

The savings due to the above are significant, but the main reduction in cost of operation has been in labour. Formerly three men (one each eight-hour shift) were employed to look after the furnace operation, but now one man only is employed during the day shift, and over-night the night watchman has his attention drawn by a warning system if required. One man comes in at 12 midnight to carry out the bogie changeover, the earlier one being at the end of the day-shift, at 6 p.m.

Other savings are obtained, but are more difficult to assess. For example, the throughput is so much faster, resulting in greater turn-round with no castings being held in the furnace for long periods, compared with the previous experience of more than a week. This means that there are fewer castings in process and less money consequently tied up in stock; and further, the customer can more easily be satisfied with shorter delivery times. It is reported that relatively low power cost is a feature of this installation. With the resistance-furnace load improving the overall factory power-factor, and by heating up charges overnight within the region of 100 kva increase in the previous maximum demand, the unit-cost for electricity in this foundry is actually less than it was before the furnaces were installed.

Crane, Limited

One pair of furnaces, of the same size as those at Ley's Malleable Castings Company, Limited, has been installed at Crane, Limited, with space left for a future pair in the same shop. At the time of writing when the installation has been in operation for a few months, it seems that the economies obtained might justify replacement of the existing furnaces. Production is of all sizes of pipe fittings up to the largest made and satisfactory annealing has so far been obtained. The net charge weight averages 15 tons, but under favourable conditions 17 tons has been accommodated. A double tier arrangement using old oil drums has been adopted, as with this size of furnace elsewhere.

Operation

Each bogie is unloaded and reloaded during normal day-shift hours. With the different types of casting, and many more in a load, than in the other installations, the labour figure is higher and is about three man-hours per ton which is still regarded as economical. Some of the extra time is accounted for by the fact that distortion has been practically eliminated by careful packing.

With this plant, while still employing a total cycle of 48 hours, it has been found possible to obtain completely-satisfactory annealing without preheating a cold load slowly in the low-temperature furnace. There is therefore only one changeover within normal hours at the end of the working day, and consequently no necessity for a night operator. The advantage of night heating of the cold charge is retained, and moreover, the annealed charge has the night period to cool down ready for unloading to commence next morning.

Power consumption is averaging 430 kwh per ton, which is considered to be very good. The oil drums used for loading are giving a better life here—it is currently working out at 20 or more treatments—so that the cost per ton is extremely low. It is too early with this installation as yet to comment usefully on maintenance.

Conclusions

One of the most noticeable features of this type of plant, compared particularly with the former usual method of pack annealing in furnaces fired by powdered fuel, is the relative cleanliness. Complaints from neighbours have been reported in the case of all the foundries referred to, to the point of local Council action, until the electric furnaces were installed. Since then, smoke and dirt nuisance have been eliminated, or much reduced where part of the old equipment still exists and, in the foundry itself, working conditions are said to be much better. Finally, it is claimed that there is a very substantial saving in operating cost.

INTERNATIONALER GIESSEREI-KONGRESS
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Zürich Diary . . . By A. R. Parkes

(*continued from page* 542)

Resuming the first-hand report of the proceedings of the International Foundry Congress held this autumn in Zürich, the present section concludes the series of extracts from the technical papers presented. Following this, accounts are given of Swiss works visited personally by the writer and, finally, the remaining social events of the Congress, the closing session and committee work are briefly reviewed.

Concluding the account of the Zürich Congress proceedings, the opportunity is taken initially of reviewing the remaining three technical contributions. These were, respectively, papers by Japanese, Hungarian and Russian authors, as follow:

Influence of Supercooling upon Fluidity of Molten Metals

By S. Morita

Synopsis

Some experimental facts which will be very difficult to have explained on the ground of the A. Portevin's and P. Bastien's solidification-range theory have been observed in studies on the fluidity of molten alloys by several investigators as well as by the author. In the present paper, the anomalous facts that the minimum fluidity does not agree with the maximum solidification range, and that fluidity of the hypereutectic alloy is superior to that of the eutectic alloy have been studied by using some binary magnesium alloys, binary aluminium alloys, a tenary aluminium alloy containing silicon and copper, and some cast irons, as representative of the many-component alloys. Four types of fluidity test-mould have been used for the study on binary magnesium alloys, binary aluminium alloys and cast iron, except S-H cast iron. (S-H cast iron is a Japanese eutectic-graphite cast iron containing titanium.) Three kinds of metallic mould were used having a horizontal straight test channel of an inverted equilateral triangular cross-section, each side of which is 7 mm. A spiral shell mould was used for the study of S-H cast iron. On all of them, a sand mould-basin is placed, this being fitted with a stopper which acts to equalize the statical head of the molten charge throughout the test. The superheat, *i.e.*, the difference between the pouring temperature and the liquidus temperature in the equilibrium state, was kept constant.

From the results obtained, it has been found that the anomalous facts mentioned earlier may occur due to the supercooling of the molten alloy flowed into the test channel. The molten alloy has been poured into the test mould at the constant superheat. Therefore, if the molten alloy is supercooled, due to rapid cooling and the primary crystallization temperature in the case of the hypereutectic alloy is not higher by a certain degree than that in the case of the eutectic

Some past-presidents of the International Committee of Foundry Technical Associations in session at their meeting on the Monday of Congress week. From right to left are:—Prof. F. Pisek (Czechoslovakia); Mr. R. Depréz (Belgium); Dr. A. B. Everest (Great Britain); Dr. A. Dacco (Italy); Dr. G. Schwietzke (Germany), and the interpreter.

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alloy, the difference between the pouring temperature and the primary crystallization temperature in the supercooled condition in the former is to become wider than in the latter. Consequently, the time interval during which the perfectly liquid alloy flows in the test channel in the case of the hypereutectic alloy is far greater than in the case of the eutectic alloy, and so the fluidity of the former alloy is more than that of the latter. Also, the anomalous fact that the minimum fluidity does not agree with the maximum solidification range can be probably explained in the same way.

Experiments and Results with Light-alloy Castings Produced in Aluminium Dies

By K. Maréchal (In German)

Synopsis

The paper discusses in two sections the experiments performed with aluminium dies and the results of these experiments. In the first section of the paper, tests made with pistons of G-AlCu-Ni alloy (Hungarian alloy) are discussed, the purpose of the experiments being to develop higher strength properties by refining the structure of the material. The second part of the paper describes the way in which the dispersion of the hardness values in castings made of the alloy (G-Al/Si/Cu/Ni) can be eliminated. The hardness values of castings produced in cast-iron dies showed a very great dispersion which, in turn, has detrimental effects on the use of the castings.

The paper also deals with the determination of the rate of solidification of each alloy and it can be derived from the results obtained that, due to the higher heat-conductivity of the aluminium dies, solidification is taking place within a shorter time, producing a finer structure and improving the strength values. A piston is mainly subjected to dynamical load and for that reason the impact strength of the material must be tested. With the silicon-base alloy, L.A.C.-112 Al (Hungarian alloy), almost identical experiments were carried out and here the main object was to determine the variations of hardness. It was found that by the use of an aluminium die, the castings have a finer structure and this influences not so much the hardness but rather its uniformity, which from the practical point of view is of equal importance. The use of aluminium-alloy moulds is economical and has good results such as improvement of quality and the use of such moulds is justified even for the production of a small number of castings, since their cost of manufacture is considerably lower than that of cast-iron dies.

Some of the seventeen Japanese delegates who attended the Congress. (Invitations to hold a future Congress in their country have been extended to the Committee by both Japanese and Indian foundrymen.)

Modification of Cast Steel

By N. S. Kreschtschanowsky (not pre-printed)

There was a "full house" for the final technical session to listen to the paper by the Russian author, part of the interest stemming, of course, from the fact that this represented the first USSR contribution to the International Technical Committee's proceedings. The paper had not been pre-printed and the author was not present to read it in person, this being delegated to his friend, Professor G. de Béco, who had collaborated in some of the work.

Initially the rapporteur explained that he would read the report in French but that he would be unable to deal with questions other than replies he could formulate from the paper itself. Delegates' queries which he could not deal with could be referred direct to the author. The report which he had for presentation fell in two parts: (*a*) principles and theory and (*b*) results of tests and application of the theories expounded.

Beginning his summary of the Paper, he said the author considered that all modification procedures were generally of two types (1) those that influenced the melt (surface-tension, etc.) and (2) those affecting crystallization, not in the melt. The Paper was mainly concerned with the first type, the principal effects discussed being those related to surface-tension. Here the first illustration was shown, giving the surface-tension in dynes per sq. cm. of boron-, magnesium-, calcium- and cerium-treated steel. This disclosed certain minima for boron and magnesium but not for calcium. The rapporteur explained at this point that it was not economic to have too much cerium, *i.e.*, both a metallurgical optimum and an economic optimum must be taken into account when considering various modifying materials. Also to be borne in mind were the quantity added and the quantity remaining in the alloy; the author's results were based on the amount added. It had been found

Incidents and Personalities of the Zurich International Foundry Congress Week

Informal groups of Congress delegates photographed at various gatherings during the week at Zürich. (A) Dr. Dacco (left) chatting with Mr. J. M. Lainé, one of the official French delegates; (B) group of British participants: left to right, Mr. W. L. Peake, Mr. J. M. Middleton, Mr. C. A. Peake, Mr. R. G. Godding and Mr. Q. C. McMillan; (C) Mr. F. Webster exchanging comment with Mr. R. Burleigh; (D) Hungarian degelates: Mr. J. Payer, Mr. Z. Gal and Mr. L. Kalman; (E) party including (seated) members of the Russian delegation and (F) Mr. F. J. Dost (from US) chatting to a European friend and Mr. W. Form (also from US) talking to Dr. A. B. Everest (UK).

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that cerium had a much lower effect on the surface tension of steel. Five photomicrographs were next screened showing the effect of various materials on the grain structure of steel and quoting amounts necessary to produce such an effect, *i.e.*, calcium 0.5, magnesium 0.2 and boron 0.05 per cent. for austenitic steels. For carbon steels, 0.2 per cent. cerium, 0.5 per cent. calcium and 0.1 per cent. of boron were added respectively. A further slide was used to show the effect of modifying agents on grain-size, according to the amount added, confirming that cerium had little effect, calcium and magnesium more effect (about the same as each other) and boron, most effect, yet with only 0.1 per cent. addition. Here the rapporteur explained that the mechanical properties of the steel and the grain size could not be related in a linear manner but no doubt there was some connection one with the other and studies of this were continuing.

Physical Properties

The next illustration quoted results relating modification to the physical properties of the steel. All the results showed relatively small effects on the strength and all were of about the same order, but it was demonstrated that the plastic deformation properties of the steel more or less followed the alloy content. This last observation had not been confirmed, but it appeared that plasticity was mainly diminished with increased alloy addition. Next was shown an illustration showing the effect of modification on the properties of austenitic Ni/Cr steels and a further one showing the influence of modifying elements on cracking resistance (presumably, hot-tearing), it being revealed that calcium appeared to have no influence on the cracking resistance of manganese-steel. It was also shown that cerium generally had no influence on chrome/vanadium/molybdenum steel, but for vanadium/nickel steel the addition of cerium steeply increased resistance to cracking.

Discussion

After the rapporteur had been thanked by the president and the invitation for members to submit written questions to the author had been repeated, the discussion was opened by Mr. Form (who had previously presented a paper to the Congress—jointly with colleagues—on the grain refinement of cast metals). His opinion was that surface-tension between the liquid metal and ambient surface atmosphere would not reveal any pertinent result and he asked what was the objective of this part of the Russian research. To this the rapporteur, replying on his own account, said it was indeed necessary to distinguish between different types of surface tension. Of importance to the subject under consideration was interfacial tension between the liquid metal and the solidifying grain and it was this the author had endeavoured to measure. Replying again to a further query from the same source. Professor de Béco quoted from his own work, adding that the Russian research had only been concerned with four modifying addition materials. He also had found that different effects were realized with different types of steel according to the solidifying phases present. He confirmed that the author had not attempted to make general deductions from the quite sparse results so far reported. Closing this section of the discussion, Mr. Form said that it was interfacial tension between parts of and grains in the melt which mattered and with this the rapporteur was inclined to agree.

Mr. Jack Hill (Ley's Malleable Castings, Limited) chatting outside the Congress Hall with Mr. H. Morrogh (director, British Cast Iron Research Association) before departure on one of the series of works visits.

Hot-tearing Tests

Questions were resumed by a German foundryman who wished to know if the "tearing" qualities referred to in the paper were in fact hot-tearing and the reply was in the affirmative, with the added note that addition of cerium to manganese-steel reduced this tendency. The same questioner then asked how the tests were carried out, the rapporteur replying that a steel bar was poured in a standard manner and at one end there was placed a load. Two types of apparatus were used to measure the strain, a rough and ready one using levers and a second of greater accuracy employing strain-gauges. This concluded the discussion.

WORKS VISITS

The whole of the second day of the Congress (Tuesday) was occupied by the male members of the Congress in a series of works' visits or—for those involved—in meetings of various sub-committees of the International Committee. The latter comprised committees on the testing of cast iron and for a foundry dictionary, together with working groups dealing with (*a*) founding properties of materials, (*b*) testing of CO_2 materials, (*c*) foundry clays and (*d*) foundry coke. The ladies were

offered a series of five sightseeing excusions covering the whole of the day and in these gentlemen could also participate if they so wished. It was unfortunate that one of these—a flight over the Swiss Alps—had to be cancelled at the last minute because of bad weather.

A choice of no fewer than 32 separate programmes of works' visits was offered this day, the travel almost without exception being by motor-coach. In all, 24 different works were open to the visitors in various combinations of morning and afternoon rendezvous.

Louis de Roll Iron Works

The writer chose visits series No. 3, taking in the Louis de Roll Iron Works, Limited, at Klus, and in the afternoon, H. Ruetschi, Limited, at Aarau. Starting at the early hour of 8 a.m., an interesting coach journey lasting two hours brought the party to the large works of the de Roll concern at the town of Klus overshadowed by huge limestone cliffs. The main foundry products here are structural components and valves for pipelines (and particularly for water at high pressure), conveying and loading machinery, metal-forming and -cutting machines, hydro-electric power plant, and components for building, ceramics, paper, rubber and plastics industries. Employees at the Klus works number 2,500, of whom 1,000 are located in the foundry, 800 in the machine-shop, the rest being staff (450) and general labour and maintenance men. In all, the de Roll Iron Works, which were started in 1823, employ in their six works about 7,500, the head works being at Gerlafingen (a steelworks, rolling mill and forge). The works at Klus concentrates on foundry products and machining, while that at Choindez produces pipes and miscellaneous general castings, at Rondez, mainly municipal castings are made and at the Olten works large castings up to 50 tons. The firm also has a foundry at its Berne works, where mainly cable railways or *telerifiques* are manufactured. Some idea of the size of the undertaking at Klus (and also the demand of such large undertakings on the country's electric power system) is given by the following figures for electrical requirements at the works. The installed capacity of electric motors is 15,000,000 kwh. and of heating units 12,000,000 kwh. The actual loading of motors at any time averages 3,800 kw. (heaters 3,700 kw.); the total maximum demand of these two groups being 17,000 kw. and 4,500 kw. respectively.

Tour Route

Arriving at the works, the party was ushered into a well-appointed lecture-room for brief introductory remarks by one of the principals of the firm (delivered in German) which included some of the data outlined earlier. Following this, the party went first to the workshops (a designation covering both machine-shops and those for the assembly of valves, etc.), the foundry proper, the melting plant and the laboratories. The foundry produces mainly grey iron and alloy-iron castings, together with some assemblies including stainless castings and can handle a size range of from 10 mm. to 4 metres. A number of transmission systems, including gearboxes, are handled in entirety, together with hydraulic pumps of variable delivery and also piston types.

The total production is of about 20,000 tons of grey iron per year, along with lesser amounts of steel (for own use), brass and aluminium castings, specialities including magnet steels and silicon-iron castings; there is some chromizing treatment done on the premises, although galvanizing is sent out. Quite a speciality is made of hydrants and valves, especially high-pressure types for waterworks, hundreds of different types being involved, some in numbers up to 15,000 per month. There are also vitreous-enamelling shops—for baths and cooking pots—but these were not seen.

Entering the large machine-shop, a point which impressed the visitors was the efficient opening of

Groups of (left) English-speaking and (right) German-speaking delegates photographed at the commencement of one of the visits to the von Roll concern at Klus (on the Tuesday of Congress week).

Zürich Diary

the rubber doors by a combination of photo-electric cell and pneumatic actuating mechanisms. This section of the works was of reinforced-concrete construction with saw-type roof structure and northlight glazing. In the tour, a number of quite large jobs were inspected in course of machining and assembly, including some cast/weld constructions. Although there were some very large steel castings on view, it was learned that only those up to ½ ton are produced at Klus, the larger ones being purchased from Germany. An example of these was a bowl-shaped casting comprising half a butterfly-valve, 12-ft. deep and weighing 15 tons. Also being assembled were large ball-valves for turbines to work at pressures up to 500 or 600 atoms. These involve 20-ton half-castings, which, with their water-piston type of actuating gear, also of cast construction, made quite impressive examples of the large jobs produced by the firm. In addition, in the same shop large iron castings were being machined for assembly later into nut-and-bolt presses. Glass-lined tanks and autoclaves were also being assembled.

Foundries

The firm has three grey-iron foundries at Klus described as catering for "large," "mechanized," and "mixed" production. Almost universal use is made of synthetic sand, using a raw sand (brought from as far away as Paris) together with bentonite. A fair proportion of both the sand-handling and moulding plant is of British manufacture. In the mechanized section, a fairly new installation including a battery of automatic BMD moulding machines was inspected, utilizing a rather heavy type of box-part 350 by 450 mm. in depths of 90, 125, and 175 mm. A feature here was the use of a reversible delivery belt under the sand bunker serving the weigh-hoppers for containing the moulding sand above the pair of machines. Moulds were stored on roller-conveyor banks to await pouring, the gangways being of galvanized steel floor-grids erected at the same height as the conveyor. Also inspected in this foundry was a large Swiss-made unit for producing top and bottom moulds simultaneously in a bump/squeeze/turn-over sequence. This machine was made by the firm of Mezger and used box sizes 460 by 620 by 200 mm., in a push-button moulding set-up, operating in conjunction with a device alongside for cleaning, turning over and assembly of half-moulds, which were carried on swinging arms. It was noted that during mould assembly ceramic filter-cores were incorporated.

In the coreshop which was inspected next, there was much handwork, but two Hansberg H25 and H12 model blowers were in use for CO_2/silicate bonded cores, the CO_2 being obtained from a battery of cylinders. A number of resin core-boxes were being used, but it was understood that these had been purchased from abroad, although the firm has its own quite extensive patternmaking facilities.

In the fettling shop, to which the party passed next, there were plenty of power-operated tools in addition to a large Wheelabrator which incorporated a series of hangers for carrying castings in figure-eight fashion through the installation. A number of large rumbling barrels were in operation here and these, together with extensive hand fettling, produced castings of excellent skin quality. It was observed that the fettling-shop operators were wearing eye-protective devices but none wore masks. As to internal transport, the works was covered with a network of narrow-gauge rail-tracks, but it was understood that this system is being replaced by battery-operated mobile trucks.

Melting Plant

Next in the tour of the works, the party visited the melting shop, where a most impressive battery of three MBC cupolas were situated, two of these being operated simultaneously. They are basic lined, of 1,750-mm. dia. inside and cooled by external water cascades on the shell. The cleanliness of the paintwork and general tidiness of this melting shop was noteworthy. Also housed in the same shop were two mains-frequency holding furnaces; one of these was a Brown Boveri unit of 500 kw. loading and 5,500 kg. capacity, the other being a Junkers furnace of 350 kw. and 6,000 kg. capacity. There was also a third electric (melting) unit, also by Junkers, of 450 kw. load and 1,500 kg. capacity. This, it was understood, is being mainly used for s.-g. iron production. To complete the survey of the melting shop plant, there were situated adjacent to the cupolas barrel-type tilting receivers, each of about 5-ton capacity.

Continuous Casting

Nearby, there was next inspected a Wertli plant for the horizontal continuous casting of grey-iron bars. This process employs graphite moulds (see JOURNAL, October 27, p. 523) and produces solid bar in diameters up to 100 mm. by the intermittent-draw method. The machine took metal from an oil-heated reservoir (crucible-type) of 300 kg. capacity and, of course, the die ring was water-cooled.

Other Departments

Visiting next the cupola-charging plant, the party was impressed by the elaborate skip-chargers, one for each cupola, and the sensible arrangement of stock-bins, etc. Notable here was the use of broken glass for slag production in the cupolas, used in conjunction with limestone and fluorspar. The charge-preparation system included the use of storage-bins for metal on either side of a scale-car track. A mimic diagram was installed for the charging sequence which showed continuously the charge level of the cupola/s in operation at any given time. It was explained also that all possible precautions are taken to ensure uniformity of cupola output, the unusual step being taken of cooling the air-blast at the inlet point to as low as 1 deg. C., so as to remove water-vapour, which had previously been found to cause irregular results.

The final section toured was the laboratory, the scene of the celebrated researches carried out by Dr. A. Collaud. Here the visitors were conducted from room to room, inspecting apparatus and equipment. Notable among these was a dilatometric equipment for measuring thermal expansion and contraction of grey iron and vitreous enamels and giving a autographic record on a photographic plate. There was also apparatus for the analysis of thermal phenomena of metals, for example, cooling-curve determination at time/temperature intervals. The chemical laboratory was very clean and neat and there were on view apparatus for the photometric analysis of molybdenum, a spectroscope for the quantitative determination of chromium in grey iron using a Fuess "Spektromat" apparatus. This equipment could, it was explained, also be used for the qualitative analysis of other elements in cast iron; for chromium estimations the time taken had been narrowed down to from half to a quarter of an hour, the instrument giving an accuracy of 0.02 in a 0.1 per cent. chromium metal or 0.05 in a 0.3 per cent. chromium metal.

After noting also in the laboratories the pneumatic-tube delivery system for samples taken in the foundry and inspecting a show of cast-iron enamelled cooking ware of modern and pleasing designs, the visitors left the works for luncheon as guests of the firm at the Hotel Rossli nearby, where they were also handed brochures and other publicity concerning various products of the works. Each delegate was also presented with a 6-inch handsome cast plaque of the firm's melting plant in bas-relief, suitably inscribed as a momento of the occasion. Incidentally, it was learned during the luncheon that the von Roll concern has a licence to make "Elkington Gatic" manhole covers under arrangements with the Dover Engineering Works, Limited, of England; these are made in another works of the group, not at Klus.

H. Ruetschi, Limited

The works visit on the afternoon of the same day (Tuesday) was for the writer a most gratifying interlude in a very busy week. This was because the works is essentially an art foundry, and although the firm was established in 1824, it had methods and processes and an "atmosphere" which seemed to take one back into the Middle Ages, away from the hurly-burly of modern life. Approximately 40 people are employed, and a speciality is made of the founding of bells, although other components in various non-ferrous metals are produced, including figures (some very large) and plaques, and a few items in cast iron.

On arrival, the party of Congress visitors was welcomed by Madame Amsler, the managing director and present owner of the firm, speaking first in German, then French and adding a note in English. The foundry itself proved to be a quite sizeable building, with a melting furnace of huge proportions at about the centre and much of the remaining floor-space occupied by a large pit for containing moulds prepared for pouring.

It appears that bells up to a total weight of about 8 tons are made at these works and that the firm continues a business of bell-making which has been practised on the same site since the year 1367. In fact, a well-produced brochure handed to the visitors lists the date, destination, weight and tone of all bells of consequence cast by the firm over the last 125 years, the number running into well over a thousand. In the same book are coloured photographs of some of the bells, chiefly those carrying considerable exterior decoration, together with interesting illustrations of the method of production, leading up to the eventual installations of the bells on site. One of the latter shows the manhandling of a bell up a steep mountainside and another about six teams of horses for moving another consignment—pictures which bring home the serious nature of transport difficulties which years ago faced the makers of large and awkward castings. Although several tons is the top weight range of bell production at this foundry, quite normal sizes are those

Madame Amsler and Mr. Wernli, president and works manager respectively of the bell foundry of H. Ruetshi, Limited, at Aarau. A "Chiming Ceremony" was staged for the visiting party outside the foundry.

Some of the tables at the Annual Banquet held on the Wednesday of Congress week. On the platform Mr. Guyer, president of the Congress organizing committee, is proposing the toast of "The Ladies," with Mr. F. W. E. Spies, International Committee president, on his left.

of 33, 14 and 8 cwt. Tuning also is undertaken in the works and for this the works manager, Mr. Wernli, is responsible. It appears that tone can be adjusted in the tuning process, it being relatively easy to deepen the tone, but not so easy to raise it. The process of tuning relies on skim machining the different areas of sound production in the bell's design.

The bells are all pit moulded with hollow loam cores; the latter are prepared first, by strickling a mixture of loam and horse-dung prepared in a simple mixing machine. Such cores are dried *in situ* by placing a charcoal fire inside, the cores being reinforced with metal. A replica of the actual bell to be produced is then built up on the core using "thickness-pieces" of clay and wax and, finally, more loam is applied, together with a lifting cage for reinforcement and this is trickled off to produce the "mantle" or outer mould half which forms the outside shape of the bell. At the time of the visit, about 10 bell moulds of varying sizes from 3-ft. dia. downwards were being rammed in the pit, preparatory to pouring.

Melting and Pouring

At the Aarau foundry, the melting furnace for bell metal, designed basically on reverberatory principles, is fired with wood charcoal and can melt 13 tons in 15 hours—of the usual bell-metal alloy, containing roughly 21 per cent. tin and 79 per cent. copper. The whole of the moulds are rammed around solid in the casting pit and channels from the melting furnace are cut on top of the rammed sand and extended to each mould. Most of the bells carry inscriptions and these are formed on the inside of the mantle (or outer part of the bell mould) in the shape of positive designs made in wax which are applied to the "pattern." Patterns for the crowns—that is, the support devices for hanging the bell, are made by "slush casting" wax inside what are the equivalent of permanent multi-piece coreboxes made of plaster. A large number of these plasters are kept in stock, catalogued in the same manner as are patterns in ordinary foundries.

After spending some time watching the moulding processes and inspecting patterns and models, the party visited the trimming and grinding shop where it was gratifying to find such an old-established concern using modern mechanical labour-saving aids, such as portable power-tools for grinding, fettling, cutting-off, etc. Next, the visitors saw the tuning outfit for bells, handled by Mr. Wernli, which contained a large selection of variable-tone tuning forks. It was stated that a practiced ear can distinguish differences in pitch to one-tenth of a half-tone. It was also pleasing to learn that arrangements are being made for this skill in bell-tuning to be "handed down" from one generation to another. In the yard outside the foundry, the party next inspected a six-bell peal for the town, for which the various notes in the scale were produced from a Bourdon bell of 7 tons weight and other bells of 3¼, 2¼, 1½ tons, 12 cwt., and 8 cwt. (B1-minor). These bells were then rung in honour of the visitors and all the town came out to watch—a very fitting conclusion to a memorable afternoon's visit.

At the conclusion of the visit, the party repaired to a local hostelry for "high tea" as guests of the firm. Here it was learned in general conversation that the firm used to make brass cannon before the Krupp concern "killed the market" by producing iron cannon in 1851. As to styles of bells, a query elicited the information that through the years these follow fashions—in the same way as ladies' dresses, but at greater intervals of time! For example, in the 15th century, plain bells were in vogue, in the 17th/18th, decorated designs were popular, and to-day there is a reversion to plainer types.

George Fischer, Limited

Out of the series of works visits which were offered to congress members on the Friday of Congress week, the writer chose to tour George Fischer, Limited, at Schaffhausen. This company has several foundries in Switzerland, including both iron and malleable foundries of large size in Schaffhausen itself. Travel was by coach, leaving Zurich after luncheon; the journey took an hour or so and thus not overmuch time was left for detailed

inspection of the foundry. The result was that it was the malleable section and, in particular, the automatic (Buhrer) system of moulding and casting which received most attention from the writer. Here a most thoughtful provision by the management was the clearing of gangways and erection of wooden platforms to span conveyors, etc., so that delegates could view the plant at close quarters without danger.

Notable Features

The following notes embody points which to the writer at least represented significant detail achievements in the malleable plant inspected:—

In loading ore for packing malleable. castings, it was noted that a checked ratio of ore to castings is packed into each heat-resisting steel annealing box. The ore is delivered down a chute into each box in turn and packed around about one ton of tube-fittings. The box itself is securely held on a table which can be vibrated to assist packing. Thereafter six boxes, carried on a bogie, are loaded into a gas-fired (producer-gas) tunnel-type continuous annealing oven. At present, the time cycle for malleablizing such items is 150 hrs., including heating-up and cooling periods. A vibratory knockout was in use for separating castings and ore after annealing; this worked in conjunction with a very efficient ore-reclamation plant. Castings then passed to a rotary separator and then on a belt conveyor for sorting, which was carried out by girl operators.

The system employed for handling castings in the Fischer dressing shop has much to commend it. Large hoppers containing castings were disposed adjacent to individual grinders with a gate feed from which each operator could take castings—at grinding-wheel level. The feed hoppers themselves were being loaded *via* chutes from tote bins carried by crane. After grinding, castings were placed into other tote bins arranged alongside the operators. In conformity with quite normal practice but perhaps on a larger scale, much use was made, when grinding, of pincers having powerful grips for holding the castings. The handling system included the return of components to yet a further series of tote bins after primary "grinding inspection." The tote bins themselves were usually of a drop-bottom design, and very substantially constructed. Larger castings handled in this shop included wheels, hubs and brake-drums for the automobile industry. The shop itself was a light airy building the roof of which was constructed basically of precast concrete roof-units similar to those the writer had seen previously in the company's works at Singen in Germany.

Important castings and certain of those for automobile applications which are produced in this foundry are given a spheroidizing treatment following annealing. This process consists of air quenching components from 800 deg. C. and tempering, the operations being conducted in relatively small pusher-type radiant-tube-type gas-fired ovens.

The coreshop at the Fischer malleable foundry at Schaffhausen is located on the first floor. All cores are produced in oil-sand and many of them are blown on a battery of Demmler machines. In addition, cores are made by hand by both male and female operators working at side benches. Remarking that the walls of these shops were rather dirty (having in mind the UK requirement for annual limewashing), the writer was told that the whole of this foundry is due for demolition shortly, following erection of a new foundry on a nearby site.

The sand plant was next visited. Here it was remarkable that much of the sand for the unit system is a silica type which was being imported from Belgium (a distance of about 400 miles!), although a certain amount of local clay-bearing sand was incorporated at the mill.

Moulding and Pouring

Passing on, the special Fischer automatic moulding and pouring system, which has received recent publicity,* was inspected. (It was here that the special platforms and access walkways had been erected for the visitors.) This plant employed box-parts about 24 by 20 by 8 in. of a very substantial construction, which were fed into automatic three-station moulding machines, separate units being arranged for top- and bottom-half moulds. The basic cycle of operation was (*a*) pattern cleaning, (*b*) first facing-sand application and then backing-sand addition (measured) followed by jolting, and (*c*) press and then strip and deliver the mould-half to an adjacent conveyor, where the regulated delivery of mould-halves to a pallet conveyor was arranged mechanically prior to core placing when required. Separate moulding units were set up for producing top-half moulds. (Although it was learned that this plant at Schaffhausen is scheduled for replacement, it is understood that a second and improved moulding plant of the same type is already in use at the firm's plant at Mettman and that a third plant is also being erected by the same firm at their Singen works.)

In passing, the quite elaborate set up of mould plates for these machines is worthy of mention, as is also the way in which patternplates are sub-divided into halves, quarters and eighths for the insertion of patterns from which castings are required in smaller numbers.

Pouring

Equally of interest to the writer, along with all the other visitors, was the automatic pouring plant worked in conjunction with the automated moulding cycle. Here each type of mould produced had its own pouring ladle designed to hold exactly the correct amount of metal and this metal was poured into the mould without the use of any manual labour. Briefly the mechanism was one in which molten metal (contained in U-shaped transfer ladles replenished by bogie-carried ladles from the

* See "Notes from the Branches" page 617 of this JOURNAL.

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melting plant) was weighed out into the pouring ladles repetitively through a bottom-teeming device. (It was disclosed that, initially, considerable trouble in obtaining constant deilvery weights of metal throughout the day had been experienced because of nozzle enlargement; this had been remedied by applying forced-air cooling at the nozzle.) From the small pouring ladles when located above the pouring basin of the moulds, metal was delivered automatically by tipping into the runner-system. A choice of three sizes of ladle at each station permitted delivery of three different weights of metal to suit any given mould programme which was running.

Questioned about maintenance of this plant, the guides admitted that 25 per cent., down-time was currently being experienced to cope with mechanical maintenance and adjustment but it was hoped to get down to 10 per cent., as a running figure. Scrap was quoted to be currently running at 5 per cent. The metal itself was furnished from a cupola/receiver system utilizing hot-blast units running for 18 hrs. per day. These cupolas were said to be provided with rammed monolithic, "acid" linings and to be in use for five nine-hour shifts making up the 45-hr. week; no water-cooling of the cupola was being practised.

Sand System

Notable in the sand system at Fischer's, which was inspected next, was the use of a Schenck sand-cooler. This design depends for its success on the employment of a substantial water addition to the sand arriving from the knockout, followed by the suction of air through pans of sand to effect the necessary cooling by evaporation of water. The users claim that the system has proved quite efficient and that with about 80 tons per hr. throughput, about 25 deg. C. reduction in temperature was possible, the process becoming more efficient with hotter sand. The low velocity of the air percolation through the sand was said to avoid sand or binder loss. The above figure for temperature reduction of the sand was quoted for the output of 265 moulds per hr., which was currently being realized in the moulding plant served. If hotter sand were received at the sand plant it was customary to make a larger water addition, sufficient to leave after cooling enough moisture to suppress dust.

Apart from the Schenck cooler, the sand system was more or less orthodox, with bentonite and coal-dust being added automatically at Simpson batch-type sand-mixers. All the plant was sequence controlled, using Mimic diagrams to assist visual appraisal of the systems in use at any particular time. It was significant, however, in this plant—where almost every operation was performed automatically—that water addition to the sand was under meter control, but that ultimate estimation of the amount present in the sand as delivered to the moulding machines was according to "feel" in the hands of a skilled operator.

General

In general comment on the plant, the writer was informed that first experiments with the Buehrer system had been undertaken in 1956 and each moulding machine for top and bottom halves has its own facing-sand and backing-sand systems.

On the way out of the plant, recent excavation work on the limestone cliffs surrounding the works was commented upon, the guides explaining that the material cleared in this way to make room for further factory extensions could in fact be used as flux in the cupola!

After leaving the works, the delegates were entertained to high tea in a nearby hall as guests of George Fischer, Limited, and brochures about the firm's plant and productions were distributed.

After a vote of thanks had been accorded the hosts by the visitors, a unique feature for such occasions was the staging of a performance by a local school choir. The boys gave an excellent rendering of five songs, their youthful exuberance being in no way restricted by the international significance of the occasion.

That afternoon, George Fischer's had entertained (with auxiliary parties visiting their steel foundries) about 150 to 175 Congress delegates. The parties made the return journey by coach to Zürich by way of the famous Rhine Falls, these made a most impressive sight as the river was in spate.

SOCIAL FUNCTIONS

In addition to the social functions of the Zurich Congress week which have already been described in this "diary," there was, of course, one major event, namely, the annual dinner on the Wednesday evening. This was held in the main hall and

"Random shots" taken during the Congress Banquet: (A) Mrs. Schneider, Dr. P. Schneider (secretary, German Foundrymen's Technical Association) and Mr. Spies; (B) Mr. W. W. Maloney (US) with Mrs. Everest; (C) British delegates, Mr. R. Yeoman, Mr. J. Harvey, Mr. F. G. Butters and Mr. A. Kirkham; (D) Mr. J. Gerster (secretary, Swiss Ironfounders' Association) dancing with Mrs. Gerster (who during the week assisted at the Congress bureau); (E) a Japanese delegate exchanging autographs with Mr. B. Langum (from Norway); (F) two gaily-dressed performers during a bell-ringing act on the stage; (G) a British table at the banquet, including (left to right) Mr. F. W. Nield, Mr. D. Catton, Mrs. Blakiston, Mr. D. A. Richards and Mrs. Wilson, and (H) Mr. Spies addressing the assembly, supported by Mr. Guyer.

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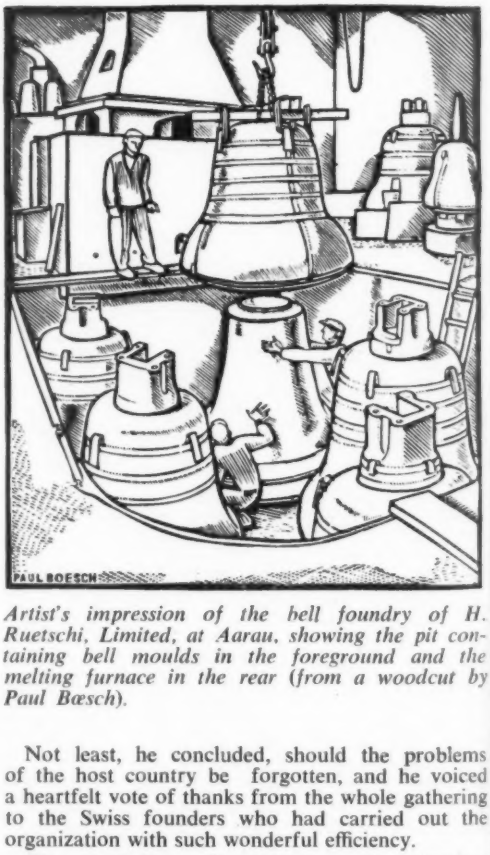
Zürich Diary

balcony of the Congress building, with "overflows" into the main foyer and the Congress foyer to accommodate the very large attendance of delegates and guests—reported as numbering 1,200 out of about 1,500 total Congress registrations! The International Committee president, Mr. F. W. E. Spies, was chairman, assisted by Mr. G. L. Guyer, president of the Congress organizing committee. The official delegates, most of whom were accompanied by their ladies, were accommodated at a group of "top" tables as follow: Mr. J. N. Alcacer, Mr. A. Arstal, Mr. J. M. Boucher, Baron C. J. Cedercreutz, Mr. N. C. Chakrabarti, Dr. E. Coppetti, Dr. A. Dacco, Mr. I. S. Darnis, Mr. E. Deprez, Mr. R. Doat, Mr. F. J. Dost, Dr. A. B. Everest, Mr. J. Funk, Mr. Z. Gal, Dr. J. Gerster, Miss R. Georgijewakaja, Mr. Y. R. W. Granström (Mr. G. L. Guyer), Mr. M. M. Hallett, Mr. W. Huber, Dr. P. Januarzewicz, Mr. A. J. A. Jimanez, Mr. L. Kalman, Mr. H. Kleis-Jensen, Mr. J. M. Lainé, Mr. J. Krammel, Mr. G. Lambert, Mr. B. Langum, Mr. J. Lassker, Dr. E. M. H. Lips, Prof. N. Malesevic, Mr. W. W. Maloney, Mr. S. Milko, Dr. I. Minkoff, Prof. S. Morita, Dr. P. W. Muller, Dr. A. Olivier, Mr. W. Orelli, Prof. M. B. Pajevic, Mr. V. J. Petersen, Mr. J. Perret, Prof. F. Pisek, Mr. A. Pirson, Prof. J. Priby!, Mr. E. L. Roth, Mr. G. R. Shotton, Mr. C. Sieber, Mr. C. Sigg, Dr. F. Sigut, Mr. E. Sinner, Dr. O. Somigli, Mr. C. G. Söderlund (Mr. F. W. E. Spies), Prof. R. Spolders, Mr. H. Stauffer, Mr. H. Steinman, Mr. F. Strek, Mr. H. van Suchtelen, Dr. P. Schneider, Dr. G. Schwietzke, Mr. K. Tanaka, Mr. S. I. Tschetweruchin, Mr. A. Vaswani, Mr. E. V. Värre, Mr. L. Villner, and Mr. M. Vuilleumier.

After the meal—a "feast" served in exemplary fashion—Mr. Guyer and Mr. Spies went to the platform (which was decorated with a background of national flags) to address the gathering. First, Mr. Guyer welcomed the whole assembly, spicing his remarks with a lively wit intelligible in all three languages of the Congress. He said when the International Foundry Committee had sought a place two or three years ago in which to hold the 1960 Congress, they had decided on Switzerland and thereafter there was considerable internal competition between the Swiss founders themselves as to which city should have the honour of providing the meeting place. It was gratifying, he added, that when the decision was made all the Swiss cantons competing for the honour had submerged their differences and worked wholeheartedly to make the Congress a successful event. As a mark of appreciation to the president, he then handed over a large ornamented bell and collar—almost a national-emblem of Switzerland—to Mr. Spies.

After he had concluded with a toast to "The Ladies," Mr. Guyer's place at the rostrum was taken by Mr. Spies who addressed the company briefly but with deep sincerity in three languages, in each of which he is quite fluent. First, acknowledging the gift of the bell, he said it would be symbolical of the way in which a bell could "ring its way into the hearts of peoples of all nations and bring them closer together in understanding."

Looking around, he said, one would think it impossible to have too many festivities, for the present example surely was adequate reply to those who thought international foundry congresses contained too great a social element. Where else could one make such valuable friendships?



Artist's impression of the bell foundry of H. Ruetschi, Limited, at Aarau, showing the pit containing bell moulds in the foreground and the melting furnace in the rear (from a woodcut by Paul Bœsch).

Not least, he concluded, should the problems of the host country be forgotten, and he voiced a heartfelt vote of thanks from the whole gathering to the Swiss founders who had carried out the organization with such wonderful efficiency.

The rest of the evening was given over to dancing, for which two dance-floors were cleared, one in the main hall and the other in the Congress foyer. In the first, the dance music was of an international character, while in the second Swiss tunes mainly provided the theme. At about 11 p.m., there was a break for displays on the stage of the main hall of Swiss folklore artistry. Amongst these were costume displays and choirs, displays of bellringing and flag juggling, *alphorn* blowing, and, of course, a number of yodelling songs by nationally-famous artistes. The proceedings concluded at about 4 a.m., although, of course, by that time the attendance had become somewhat depleted.

Other Events

It was fortunate that the Thursday after the annual banquet, was wholly devoted to a sightseeing excursion, because it enabled those who were suffering from a surfeit of revelry to relax completely in congenial comfort. Taking a special train from Zürich station, the whole Congress party, ladies and gentlemen, travelled to Fluelen, viewing on the way the delightful shores of the Lake of Zug. There, they embarked on motor launches for a trip on the Lake of Lucerne, passing the historic sites of the foundation of the Swiss Confederation (with Rutli, Schiller Stone and Chalet of Treib, in addition) before arrival at Brunnen for luncheon. For this most enjoyable meal, the party was split with almost military and yet unobtrusive precision amongst about five hotels. Adequate time was allowed afterwards for sightseeing and gift purchases in Brunnen itself, before re-embarking for the return journey. Before leaving also, there were more Swiss costume displays, choral entertainment, *alphorn* blowing and again further flag-throwing demonstrations. The return trip landed the parties at Lucerne itself, just in time to catch the scheduled special train back to Zürich, where the evening was free.

State Reception

For those who were privileged to be official delegates to the Congress (and the honour was extended also to the writer) a special State Reception was held on the Friday evening, arranged by Civic Authorities of the Swiss Cantons. Accompanied by their ladies, the guests assembled first for cocktails and then for dinner at the Zunfthaus zur Meise (Guildhall, on the Limmat, near Fraumunster) with their hosts from the Cantons and prominent Swiss foundrymen. Mr. Welter, representing the Council of Ministers, welcomed the assembly and Mr. Spies, the president, responded. In his remarks, the president referred to the increased standard of living which was now enjoyed by individual foundrymen instead of their being sometimes looked down upon. There was still a need, he said, for greater understanding between nations at all levels and increases in living standards amongst foundrymen were reflections of improvement both technical and social, resulting in considerable degree from international co-operation of the type which the Foundry Technical Committee fostered.

Closing Session

On the Saturday morning, Congress participants and their ladies gathered once more in the main hall of the Congress building in Zürich for the closing session. Mr. Spies delivered the address of closure in German and used the opportunity to make the presentation of the "Award of Honour" of the International Committee (Perseus's "Medusa" replica) to Dr. A. Collaud, the celebrated Swiss research metallurgist (who is attached to the von Roll concern) for services rendered to the foundry industry. It was disclosed that the 1964 Congress will be held in the Netherlands, thus completing the following list of Congress dates and host countries: 1961, Austria; 1962, America; 1963, Czechoslovakia, and 1965, Poland.

Sub-committee Work

Reference was also made during this session to the work of the various sub-committees of the International Committee. Amongst these were reports on activities of international groups of foundrymen working on foundry clay, coke and the founding properties of metals. There was also a report given during the Congress week of the working group considering methods of testing cast iron, for which final drafts on (*a*) graphite classification in grey irons and (*b*) an impact test for low-alloy flake-graphite grey irons were presented. In addition, it was reported that Germany put forward a request that consideration should be given to the formation of a committee for malleable cast iron. This had resulted from technical difficulties in drafting an international specification for malleable, it being thought desirable first to establish conditions under which testing, particularly impact testing, could be conducted. It was decided to set up such a working group with these terms of reference, to act under the international committee on methods of testing cast iron, and invitations were extended for the various countries to propose delegates. Work on the International Dictionary was reported to be proceeding satisfactorily; the French have now completed their work in defining 2,200 terms and the British have so far translated about 2,150. Resulting from further committee work, it was announced that the president of the International Technical Commission, Professor de Sy, had asked to be released at the end of his three years in office. In his place, commencing from January 1, 1961, the president is to be Dr. H. T. Angus, from the British Cast Iron Research Association, with Dr. A. Collaud as vice-president.

Votes of Thanks

The final speech at the closing ceremony was by Mr. Guyer and consisted mainly of thanks to everyone for their attendance with expressions of deep gratitude for the work of the various Swiss personnel who had helped magnificently with all the Congress arrangements.

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The writer would like to associate himself with the thanks expressed above and also to express a special word of commendation for the work of Dr. P. W. Muller, secretary of the International Committee of Foundry Technical Associations, and of the Swiss Ironfounders Association who, together with his colleagues, over the previous 12 months and during the Congress had put in much excellent work to make it such a great success. The ladies of the Congress also would doubtless wish to be associated with this expression of gratitude for all the many and delightful excursions arranged specially for them.

Mention also should be made of the excellent photographic service during the Congress, and, last but not least, a "thank you" should be recorded to the stewards, who unobtrusively guided the various events and kept them to that accurate timing which one associates with the host country.

Joint Iron Council's Report

In the early part of the report of the United Kingdom ironmaking and ironfounding industries it is stated that the progress of ironfounding between July 1, 1959 and June 30, 1960, served again to bring out the industry's close dependence on general industrial prosperity. By now industrialists were all too familiar with the connection between that prosperity and the problem of maintaining a strong financial position in overseas trade. It is broadly correct to say that the years of recession were induced because the country earned too little from exports to be able to afford the import costs of industrial prosperity. The UK now had had a year of prosperity but would only have more like it if exports were in sufficient volume to be able to support the economy of the country.

At the annual general meeting of the Joint Iron Council, held in the Connaught Rooms, London, on November 1, the following report for the year ending June 30, 1960, was presented to members by the president, Mr. N. P. Newman:—

Introduction

The background to the year under review forms a sharp and welcome contrast to that which characterized the three previous years. General industrial production in the United Kingdom, after stagnating during 1956, 1957 and 1958, began to move up sharply in 1959, and by the middle of that year recession, so long the topic of business discussion, was being left behind.

The indices of industrial production at the end of June, 1960, implied that industry in general was nearly 9 per cent. busier than at the corresponding time in 1959, manufacturing industry 10 per cent. busier and engineering and allied industries (including vehicles) 14 per cent. busier. With this in mind, it is gratifying but not surprising that ironfounding production in the second quarter of 1960 should be 14½ per cent. greater than in the second quarter (April, May and June) of 1959.

After only one year of high and rising industrial activity the country is again faced with the possibility of balance of payments difficulties. The Government has imposed restrictions on hire purchase, and a restraint on bank credit through the implementation of the special deposits procedure, while the reserves have been sustained only by the inflow of funds consequent upon the higher bank rate. It can only be hoped that these measures will prove adequate or that, if further action is necessary, ways will be found which will not involve another protracted period of recession and particularly a reduction in the level of investment in plant and equipment.

State of Trade in the Industry

Ironfounding Production

Production rose steadily throughout 1959, steadying and levelling off in the second quarter of 1960, 15 per cent. more castings being produced in the 12 months period up to June 30, 1960, than in the previous corresponding period. In different degrees all sections, except railway equipment, shared in the rise in activity. The automobile industry, which had been busy in the year reviewed in the previous report, proceeded to break all records in the one now under consideration. Export and home demand grew progressively stronger and manufacturers found themselves unable to meet an apparently insatiable market demand. Towards the end of the period under review, however, the new restrictions on hire purchase were seen to be having their effect, although automobile ironfounders have nevertheless contrived to increase their rates of production.

The year to June 30, 1960, has also been a busy one for the building and construction industries; the output of castings for these industries over the whole of the period equalled the record of 1956-57. Indeed, the record of 1956-57 might have been broken had it not been for a slight reduction in output in the second quarter of 1960. Despite this, the building industry, judged on the basis of the official statistics of new orders received, appears likely to continue busy throughout 1960. In the period covered by the Report output of castings for the domestic durable-goods industries was slightly higher than in the previous 12 months. The easing of financial restrictions on local authority spending early in 1959 has been a factor favourable to demand for pressure pipes, and production up to June 30, 1960, was more than 20 per cent. greater than in the preceding 12 months.

The steady expansion of activity in ironfounding has been accompanied by a dynamic growth in demand for steel; this in turn has involved considerably increased production of ingot moulds, while increased capital spending by the steel industry has led to improved demand for castings for iron- and steel-works plant and for cast-iron rolls.

The previous annual report covered a period of deepening recession in the important engineering section of the ironfounding industry. This section was slow to recover; not until the beginning of 1960 could a clear picture of rising activity be seen. Despite this slow start, the level of production over the whole period has well exceeded that of the previous 12 months. For some types of castings, however, notably those for boilers and ships, demand does not appear to have improved significantly. As was expected, the re-phasing of the

railway modernization programme led to a further contraction of castings requirements for railway equipment. Production was fairly stable throughout the year reviewed at about two-thirds of the 1958 level.

Pig-iron Production

The increase in foundry use of pig-iron followed closely the pattern of recovery in iron-castings production because, over the year ending June 30, 1960, as a whole the proportion of ferrous scrap to pig-iron in the charge remained the same as in the previous 12 months. The movement towards increased consumption of low-phosphorus iron has continued. Thus, ironfounders used 35 per cent. more low-phosphorus iron but 5 per cent. less high-phosphorus than in the previous 12 months in spite of the increase in production of pipes and light castings. Hematite consumption was 18 per cent. higher, largely due to increased output of ingot moulds and malleable iron. Refined-iron consumption rose by 13 per cent.

Iron and Steel Scrap

The principal features of the iron and steel scrap market were, first, the Government's scheme for the scrapping of redundant machinery in the cotton industry and, secondly, the ability of the scrap merchants to deal with the rapid rise in demand which occurred early in 1960. The difficulties which were envisaged through the very large arisings of textile-machinery scrap did not materialize. It had been expected that the bulk of this scrap would arise in the space of about six to nine months. Since the estimates of arisings had ranged up to 400,000 tons, it was feared that severe dislocation of the market would follow. In the event several factors combined to prevent this happening—a sharp improvement in activity in the iron foundries, and a rise in demand for cotton goods which led to some machinery being kept in temporary production. The steel industry also significantly increased its consumption of cast-iron scrap.

Early in 1960 the level of production in the iron and steel industries was such as to give rise to discussions between the Council of Ironfoundry Associations and the British Iron and Steel Federation as to the adequacy of steel scrap supplies to sustain it. Although deliveries of steel scrap in the early part of 1960 reached record levels, it was generally felt to be wise to take some measures to conserve scrap.

Coke

The improvement in trade has naturally led to an increased consumption of blast-furnace and foundry coke. Supplies of both qualities were adequate to meet the increased demand. At iron foundries there was also an increase in stocks at June 30, 1960, although, when expressed as a rate of consumption, there was a slight fall compared with the previous year. The joint cupola coke quality committee has continued its enquiries into the degradation of foundry coke in rail transit. The committee hopes to be able to arrange for tests to be carried out on roadborne coke to enable comparisons to be made.

Iron and Steel Board

Representatives of the Joint Iron Council have continued the practice of holding regular meetings with the Iron and Steel Board. At these meetings there is a discussion on the state of trade in the industry which precedes the consideration of particular matters of concern to it. The committee appointed by the Board to enquire into home ore resources, on which the Council of Iron Producers was represented, has reported.

The JIC is collaborating with the Board in estimating the long-term demand for iron and steel products. The Board has completed an enquiry into research and development expenditure in the industry and has recently repeated its earlier enquiry (made in 1957) into capital expenditure for expansion of output, increased efficiency or provision of amenities. The JIC was consulted in respect of both these enquiries.

Market Research

A special committee was set up by the Council of Ironfoundry Associations with the primary object of producing an estimate of the total tonnage of iron-castings production in the year 1965. The starting point was a set of basic assumptions derived from official sources as to the rate of development of the economy in particular sections. These were related to current production statistics. The help of trade associations and particular firms in important industries was obtained in preparing the final estimate. Due allowance was made for substitution of alternative materials or changes in the pattern of demand at every stage. The committee is now engaged in preparing an estimate of raw material requirements (*i.e.*, pig-iron, scrap and fuel) based on this forecast of iron-castings production.

Transport

During the year ending June 30, 1960, the Ministry of Transport notified industry of proposals aimed at imposing a stricter control on the movement of abnormal indivisible loads and engineering plant by road. These proposals included a power to insist upon the diversion of such loads to carriage by rail or by ship, and also a reduction in the dimensions of loads which can at present be carried by road subject to certain conditions. The Council of Ironfoundry Associations drew the Minister's attention to the particular difficulties associated with the carriage of certain categories of very large castings, and received his assurance that special orders for any essential movement of loads by road would continue to be granted in all cases where the need for road transport and the indivisibility of the load was either obvious or could be demonstrated.

Health and Safety

The detailed analysis of the material resulting

JIC Report

from the CFA's 1958 field investigation into the incidence of pneumoconiosis in small foundries was completed during the course of the year covered by the Annual Report. A report on the investigation was distributed to all ironfoundries, to the Ministry of Labour, and to the Confederation of Shipbuilding and Engineering Unions. Copies of the report were also made available to other British and overseas foundry associations, and to the national and trade Press. The general picture revealed by the results of the investigation was more reassuring than might have been feared—particularly in regard to the incidence of severe pneumoconiosis. The report emphasised, however, that the results gave no grounds for complacency and indicated the importance of continuing existing work on reducing and controlling dust in ironfoundries.

In April, 1960, the second CFA Health and Safety Conference was held at Blackpool. Nearly 100 delegates attended the two-day programme of talks on foundry health and safety topics, among which featured prominently pneumoconiosis, dust control, first-aid, the care and maintenance of grinding wheels and lifting equipment, and the problems of management and personnel in securing safe working in the foundry. The opening address was given by Mr. T. W. McCullough, O.B.E., H.M. Chief Inspector of Factories. The Conference was accompanied by an exhibition of safety equipment.

A substantial number of legislative measures bearing upon health and safety in industry came forward during the course of the year. Among those to which the CFA has devoted particular attention—keeping member-firms advised of developments and making representations to Government as necessary—were the Offices Act, 1960, the Radioactive Substances Act, 1960, the Noise Abatement Bill, 1960, a second draft of the proposed Ionising Radiations Regulations and a preliminary draft of the Non-ferrous Foundries Regulations.

The European Committee of Foundry Associations has been kept informed of the health and safety work being done in the British founding industry as a whole, and in ironfounding in particular. The report on the 1958 CFA pneumoconiosis investigation was widely distributed to foundry employers in other European countries. Two projects undertaken by the CFA health and safety committee during the course of the year, as a direct result of membership of the ECFA, were the compilation of a statement on the employer's position in Great Britain in regard to pneumoconiosis and, second, a study of the alleged prevalence of premature retirement of foundrymen for health reasons.

The Joint Advisory Committee on Foundry Goggles, on which the CFA is represented, submitted a third report to H.M. Chief Inspector of Factories during the course of the year. The work leading up to the publication of the third report confirmed and amplified the principal finding of the second report, that toughened and laminated glass lenses were unsuitable for foundry work, but that certain plastic lenses gave complete protection. The main work, however, was devoted to testing suitable frames for the lenses—a satisfactory design which has proved itself under foundry conditions being eventually evolved. The report emphasised the need for the development of other satisfactory forms of goggles, visor-type goggles and suitable face screens. The health and safety committee has prepared an outline programme of work for the next five years. The programme for 1960-61 has been formally approved and will include a detailed analysis of foundry accidents and a study of first aid arrangements in ironfoundries.

Training and Education

In the report for the year ending June 30, 1959, reference was made to a number of projects on which it is possible to report substantial progress during the year here under review. For example, the proposals by the CFA training committee for a national syllabus for training craft apprentices, culminating in the award of a certificate of craft skill, now have the support of the City and Guilds of London Institute, and that body has set up a special committee to work out the practical details.

The trustees of the National Foundry Craft Training Centre, with the support of the CFA, have launched their appeal for funds to provide a completely new building; the fund is steadily growing. By doubling its capacity in modern premises the Centre will be in a position to provide a more flexible programme of training, including provision for the increasing number of technicians.

An outstanding event of the year ending June 30, 1960, was the European Foundry Apprentice Competition, held in Great Britain, under the auspices of the European Committee of Foundry Associations. This was the third competition of its kind, the two previously held having been in France and Germany. All the staff work was done by the CFA under a joint committee of the foundry associations respectively concerned with iron, steel and non-ferrous metals. The British competitors came second in the individual and team contests among the seven nations competing. The proceedings concluded with a dinner at Tallow Chandler's Hall in the City of London, after the competitors had been given an opportunity of seeing the sights of London. The Parliamentary Secretary to the Ministry of Labour, Mr. P. J. M. Thomas, M.P., distributed the prizes. The competition has served both as a stimulus to training and as a challenge to the methods of training and recruitment in the United Kingdom.

The training committee, under its new chairman, Mr. R. A. S. Lomax, is now introducing technical short courses for experienced supervisors (as recommended by its study group on the training of technicians) in addition to the existing residential one-week courses for supervisors, which continue to receive maximum support. Another landmark in the sphere of technical training will be the beginning

in the autumn of 1960 of the new three-year sandwich course at the National Foundry College, leading to the award of an advanced diploma. The number of applicants for this course has been distinctly encouraging.

The training committee has a long programme of work ahead, including the provision of visual aids and, as the beginning of a programme aimed at assisting in a solution of the recruitment problem, the production of a simple guide to ironfounding chiefly addressed to last-year boys at secondary modern or grammar schools. The committee is taking a particular interest in the Commonwealth Training Week in 1961, and has promised the organizers all the support it can give.

The second of the post-graduate courses in foundry science and engineering at Birmingham University beginning in the autumn of 1961 has been supported by the Joint Iron Council with the offer of a scholarship, as on the occasion when these courses were first introduced. In conclusion, a special tribute should be paid to the retiring chairman of the CFA training committee, Mr. Kenneth Davis, who has inspired and led it with unfailing energy, and to whom, to a very large extent, the credit should be given for the progress that has been made.

Clean Air

Measures for dealing with air pollution from hot-blast cupolas claimed much of the attention of the technical panel on clean air during the 12 months covered by the Report. In July, 1959, the panel met the Chief Alkali Inspector to consider the "best practicable means" for rendering the emissions "harmless and inoffensive," as is required for processes scheduled under the Alkali Act. Details of the measures agreed were published shortly after this meeting; they provided for the dispersal of fume by means of a chimney and the arrestment of grit and dust by a cyclone, or by a non-mechanical arrangement in the case of the smaller furnaces. The Chief Alkali Inspector made clear that he regarded these measures as provisional in the sense that they would cover an interim period of experience. This agreement removed the immediate grounds for uncertainty which caused intending users to delay a decision on the installation of hot-blast cupolas. Operating experience with hot-blast cupolas which have been fitted with the "agreed means" is still very limited indeed. The Alkali Inspectorate has expressed a doubt whether these means will be adequate to prevent justifiable complaint in the case of some of the large plants which have been planned, and he has intimated that arrestment rather than dispersal of the fume may be necessary for the very large installations. The panel has made a detailed survey of the experience the industry has accumulated to date, in readiness for a discussion with the Chief Inspector.

It was mainly because of the varied technical problems connected with the operation of hot-blast cupolas that the JIC opposed the Ministry of Housing and Local Government's proposal to authorise the Sheffield and District Clean Air Committee to take over responsibility for the scheduled ironfounding processes in its area. The Minister originally contended that there was a *prima facie* case for hot-blast cupolas to be supervised by local authorities but, after an interview with members of the panel and other representatives of industry in January, 1960, the Minister announced that he would not favour the transfer of this type of melting furnace from the Alkali Inspectorate. Air and rotary furnaces operating in ironfoundries in the Sheffield district were placed under the local authority as from May 23, 1960. The CFA has cordially accepted the Chief Inspector's suggestion that a working party should be appointed to study the problems presented by the hot-blast cupola.

In general, cases of difficulty with emissions from cold-blast cupolas have not been widespread or persistent. The modern types of wet spray-arrester are proving highly satisfactory for arresting grit and dust, and where local conditions have involved particular problems (as, for example, the proximity of new houses and flats on rising ground) ironfoundries have been able to call upon the services of the British Cast Iron Research Association. Local authorities have exercised their powers of enforcement under the Clean Air Act with understanding and have been mindful of the financial difficulties of small foundries that have been hit by poor trade over the last two years. Nevertheless, the industry has shown through the measures taken by its members that it is fully alive to its duties, legally and socially, to prevent pollution of the atmosphere.

The smoke-control areas which are being set up under the Clean Air Act are intended to deal with the industrial causes of air pollution but, in the few cases where ironfoundries have been included in proposed areas, advice given to the companies and officials alike has generally resulted in reasonable conditions being imposed in regard to furnace operation. Air pollution from blast-furnace operation and ancillary processes is the concern of the British Iron and Steel Federation and the interests of the foundry pig-iron producers are represented on the Federation's air and river pollution committee. Through this medium the JIC continues to participate in discussions with the Chief Alkali Inspector. These talks have recently extended to the electric arc-furnace for the melting of iron and steel, in which process a few ironfoundries are interested.

Research and Development

As in previous years, the Council has regularly turned to the British Cast Iron Research Association for advice when technical questions have arisen in the course of the Council's work. Particular mention should be made of the valuable assistance rendered by those members of the BCIRA staff who serve on Joint Iron Council or Council of Ironfoundry Associations committees. The JIC has made its usual grant to the Institute of British Foundrymen to meet the expense of the work

undertaken by its technical research fund committee.

British Standards Institution

The JIC has taken a full part in the work of the British Standards Institution through its representation on the Iron and Steel Industry Standards Committee and the subordinate technical committee on cast iron. Major activities in the course of the year have been the revision of the existing Standards on grey-iron castings and spheroidal- or nodular-graphite iron castings, and the drafting of new Standards for pearlitic-malleable iron castings and austenitic cast irons. The JIC has also continued to press for the adoption of higher temperature limits for iron castings used in steam engineering; it seems that some system of marking these castings will be needed so as to identify the grade of material of which any casting is made. The British Standards that touch upon the materials and the products of the industry grow in number and diversity each year and some vigilance as well as deligence is needed to ensure that the appropriate grade of cast iron is specified for any given application. In this connection, many individual and companies have been consulted over the year and thanks are due to them for their help.

European Committee of Foundry Associations

The Council of Ironfoundry Associations and the foundry associations concerned with steel and non-ferrous metals have continued their collaboration in the European setting as described in the executive committee's report for the year ending June 30, 1959. The United Kingdom is now represented on the inner council or steering committee by the JIC president, Mr. N. P. Newman, and the United Kingdom has taken on the responsibility of a new sub-committee on market research, under the chairmanship of Mr. M. M. Hallett. A brochure outlining the work and objects of the European Committee will shortly be available in several languages. The presidency for 1960 is held by Austria and in 1961 will go to Spain.

Free Trade Area and European Common Market

The Joint Iron Council has had a voice in the events of the last 12 months through its membership of the Federation of British Industries and has been consulted from time to time by the Ministry of Power or the Board of Trade on particular matters affecting the iron industry. The general background is so much a matter of common knowledge as to need no repetition in this Report.

Press and Publications

In the executive committee's report for the year ending June, 1959, reference was made to the success which had attended the publication of "A Practical Guide to the Design of Grey Iron Castings." A fourth impression was published in the spring of 1960 to meet the continuing demand. Over 5,100 copies have been sold or distributed to ironfounders and their customers. Considerable Press publicity was secured during the year now under review; apart from special articles in the trade and technical Press, ironfounding surveys were prepared for *The Yorkshire Post* and *The Investors' Chronicle*. A survey of the industry is to be published in *The Glasgow Herald* to coincide with the 1960 convention and banquet. A foundry survey was published by *The Birmingham Post* in May, 1960, on the occasion of the European Foundry Apprentice Competiton.

Annual Accounts

The income from the pig-iron levy has shown a welcome increase due to the improvement in trade. This, together with economies in expenditure, has enabled the Joint Iron Council to make up its contribution to the British Cast Iron Research Association to £122,000 for the year. This is an increase of £12,000 over the sum anticipated, but it should be pointed out that £50,000 had been paid in the previous year as an advance contribution. The actual payment made in 1959-60 was therefore £72,000.

The BCIRA had been informed that the JIC had hoped to make a contribution of £110,000 for each of the financial years 1959-60 and 1960-61. In view of the aditional payment in respect of 1959-60 agreement has been reached with the BCIRA that if the JIC income does not come up to expectations then the total contribution for the two years shall be £220,000. In the past it has been the practice to make an advance payment to the BCIRA at the end of the financial year (June 30). The reserves of the Council have been depleted, and the contribution for 1960-61 will have to be met out of income. If future contributions are to be maintained at the level of £110,000 a year, let alone increased, there will have to be a sustained improvement in the Council's income. The finance committee has the matter under active review and hopes to be able to report a more satisfactory position next year.

(Copies of the balance sheet and the revenue and expenditure account for the year ended June 30, 1960, were distributed to member-firms with the original Report.)

Export Council for Europe

The President of the Board of Trade, the Rt. Hon. Reginald Maudling, M.P., has asked the president of the Federation of British Industries, Sir William McFadzean, to take the lead in bringing about the formation of an Export Council for Europe. After consultations, which included the presidents of other national bodies concerned, Sir William has agreed to this request and has accepted the chairmanship of the new Council for a period of three years. The Council, though independent of Government, will work closely with all departments concerned, and will be recognized and accepted by the Government as an accredited, independent organization.

Notes from the Branches

Lancashire

A gathering of over 160 members were present when the chairman of the Lancashire branch of the Institute of British Foundrymen, Mr. F. W. Nield, welcomed Mr. C. Zehnder, of George Fischer, Limited (assisted by his colleague, Mr. A. E. Probst), to this country and to Manchester in particular. They had come to present a paper and film entitled "Automatic Buehrer Moulding and Pouring Plant in the Malleable Iron Foundry of George Fischer, Limited, Switzerland." Before giving his lecture, Mr. Zehnder thanked Mr. Nield and the Council of the Lancashire branch for the welcome and hospitality extended to Mr. Probst and himself. He then described, by means of slides, the system on which the plant worked, gave details of improvements made over the last six months, and mentioned contemplated future developments. He then showed the sound film of the plant in operation.

Discussion

Before the discussion commenced, the chairman thanked Mr. Zehnder for his interesting lecture and further thanks were proposed by Mr. Illingworth and seconded by Mr. Baxendale, and Mr. Zehnder commended his audience for their attention and the reception of his paper.

The first questioner asked the lecturer of what material the box-parts were made and to this Mr. Zehnder replied that they were of steel. Asked if soft sand under the downgates gave trouble, the lecturer said that the extra sand supplied by the feed-hopper took care of this. The next questioner asked, as the moulds were jolt rammed for a relatively short cycle was mould hardness on the vertical and flat faces equal? Did the large size of the top-gating system give a poor yield? Was the metal weighed for each mould, and what was the effect of a "damped" jolt? Mr. Probst undertook to reply to these queries as follow: "Damping," he said, was very difficult to explain, but if, for example, a spring was used, no jolt would occur at all! Mould hardness was generally very good, but there might be a little softness in extreme corners. Metal was weighed for each mould, and the size of the top runner was arranged to permit rapid mechanical pouring and to prevent entry of dross. To these replies, Mr. Zehnder added that Mr. Buehrer had worked a whole year to establish his theories on the compacting of sand and (after his figures had been confirmed) had chosen the type of moulding unit to give the desired results. As a result, mould hardness was almost uniform on deep and shallow moulds.

Another speaker asked a series of questions, including: Are special sand properties required? Did the bulky runner system give rise to uneven distribution? Were "stoppers" used in ladles, and what were the maintenance problems involved? Mr. Probst again undertook to reply and said that sand control at every stage was vital and an effective sand cooler was indispensable. There was no "shadow" effect from the runner system, and regarding the query on the use of stoppers, his company had tried using electrodes for this purpose. Regarding maintenance, he said it was essential that this should be carried out by men who understood the plant thoroughly; normally two fitters and one electrician were employed.

Another question was asked about the sand used, the man who posed it saying that the facing sand used seemed to be lightly riddled on to the pattern, followed by the backing sand falling from a hopper; he wanted to know how this affected compactness. Mr. Probst replied briefly that the sand was "loose" and this evened out the compaction. Another speaker asked about plant variables and the number of rejects ensuing from the Buehrer system. Mr. Zehnder replied that with the new system, plant variables indeed presented quite a problem. As to rejects, with malleable pipe-fittings, scrap was rather high, but good progress had been made to reduce this. Mr. Probst added here that scrap was at present averaging 5 to 6 per cent., which was normal for this class of work.

Costs

The next question asked concerned the initial cost of the plant and how much manpower saving was required to balance this. To this, Mr. Zehnder said he was not able to answer accurately. For example, a prototype plant might require more men than originally expected—a new improved three-station machine was now working successfully in a new foundry and a six-station unit, at present being erected, embodied simplified controls which would effect even greater savings, but, he added, he just could not give figures in £ s. d. Asked if moulds were blown out to remove loose sand, the lecturer pointed out that this was done automatically prior to the core-setting operation. The next questions asked were: "Are the runners the same size for all castings? How do the users of the plant decide what box size to use—was it dependent on the

Mr. C. Zehnder from Switzerland addressing members of the IBF Lancashire branch at the October meeting. With him on the platform are Mr. F. W. Nield (centre), branch president, and Mr. A. E. Probst of George Fischer, Schaffhausen.

Notes from the Branches

potential market or the users' own casting sizes?" Mr. Probst, replying to the first question, said the sprues varied in length with the pattern depth so as to regulate the rate of pouring. To the second question, Mr. Zehnder said that an optimum box-size was desirable. The plant described used boxes 30 per cent. larger than the original plant. Ladle size was also a governing factor. To increase production, he said that a new box had been designed which was absolutely rigid. Another speaker said there had been no reference made to what happened to burnt cores or sand, to which Mr. Probst replied that these fell through the knockout to be carried to the cooler conveyor for ultimate reclamation with other sand. Vibratory knockouts, generally speaking, were not good for boxes was the opinion of another member who asked why a cooling time of 25 min. was allowed before knockout and why were not the boxes clamped instead of being weighted. Mr. Probst explained that his company used four cooling tracks of varying lengths, which gave cooling times of from six to 25 min., depending on the weight of castings being produced. He added that vibratory shakeout had no effect on the boxes used, as they had straight inside walls. The objection to using clamps was the time factor, but weights were arranged to suit the largest castings made.

Detail Queries

Another member asked what type of sand-binder was employed and were patterns loosened prior to stripping. To this, he was told that bentonite was used as a binder and that patterns were vibrated prior to stripping. The next question related to the castings being produced as shown in the film and the member said that these did not appear to have a large surface-area, and the sand used seemed to be of high compression and low permeability in relation to the box-size employed. Mr. Probst replied that the company's castings were mainly pipe-fittings; the facing sand carried about 6 per cent. moisture and the backing sand about 5 per cent., and he agreed with the questioner regarding the high compression ratio. Another speaker asked if the box size of 7½-in. deep was to permit larger castings to be made. Mr. Zehnder said the boxes used at Schaffhausen were 7½-in. deep, but those used at the Mettman plant were 9½-in. and 12-in. deep. Pouring equipment too could also be adapted to requirements, he added. On this same subject, Mr. Probst said that box sizes were chosen to give maximum flexibility. Replying to a further question on the selection of box sizes, the lecturer said it took 1½ min. to change a patternplate and as the moulding cycle was about 30¾ sec., the loss per change was six boxes. He thought that 150 boxes from a pattern was a minimum economical run.

The final questioner asked if the runner was extracted from the cope magnetically; in a six-station machine where one station was jolting, another stripping, etc., was vibration transmitted from one station to another; what was the diameter of the squeeze piston, and were plastic patterns heated? To these Mr. Probst replied, saying, that runners were removed by a clamp; they had not had any vibration trouble between stations, and the diameter of the squeeze piston was not important as the mass of the head gave good results. Replying to the last part of the question, he said that plastic patterns were not heated.

This concluded the discussion and the chairman thanked both Mr. Zehnder and Mr. Probst for the able and full way in which they had answered all the questions, and the meeting closed with the members showing their approval in the usual way.

Personal

Mr. J. P. TOWNSON has been appointed a director of Fattorini & Sons (Holdings), Limited.

Air Commodore J. WARBURTON, has been appointed a director of Fredk. Braby & Company, Limited, Glasgow.

Mr. J. SKELDON, sales manager of J. C. Bamford (Excavators), Limited, Rocester, Staffordshire, has been appointed sales director .

Mr. P. B. H. BROWN has been elected chairman of Worthington-Simpson, Limited, following the retirement of Sir SAMUEL R. BEALE.

Mr. John Hare, Minister of Labour, has appointed Mr. JOHN WOOLLAM, M.P. (Liverpool, West Derby), to be his Parliamentary Private Secretary.

Mr. E. J. MITCHELL, metallurgical research manager of Quasi Arc, Limited, Bilston, has been elected chairman of the Wolverhampton branch of the Institute of Welding.

Mr. KARL M. JONES and Mr. MALCOLM S. VAUGHAN have been appointed directors of the Llanelly Steel Company (1907), Limited. Mr. Jones has been elected chairman in place of Mr. H. STEWART CRAIG, who has retired.

Mr. F. D. O'BRIEN NEWMAN, chairman of the Instrument Screw Company, Limited, and managing director of Aero & Engineering (Merseyside), has been elected a director of the Birmingham Railway Carriage & Wagon Company, Limited, Smethwick.

Mr. E. M. THOMAS has been appointed resident representative in Hull of the machinery division of George Cohen, Sons & Company, Limited, members of the George Cohen 600 Group. He succeeds Mr. H. WHYMAN who has been appointed manager of the division's Kingsbury branch.

Mr. JOHN RODGERS, Conservative MP for Sevenoaks, who recently resigned as Parliamentary Secretary to the Board of Trade, has returned to J. Walter Thompson & Company, Limited, as a deputy chairman. Mr. Rodgers joined the company in 1931, and became a director in 1936 at the age of 29.

Mrs. MAUREEN A. FERGUSON has been appointed chairman of Harry Ferguson Holdings, Limited, in succession to her husband, who died recently. Mrs. Ferguson became a director of the tractor firm of Harry Ferguson, Limited, when it was established in Coventry in 1945 and of the American company, Harry Ferguson Inc.

Mr. N. G. STREAT, of Allied Ironfounders, Limited, was elected first chairman of the newly formed Shropshire Industrial Accident Prevention Group at the group's inaugural meeting on October 28. Mr. H. E. HODGSON, of Sankey & Company, Limited, is to be invited to be the first president. Mr. R. J. CORBETT of Sankeys was elected secretary and Mr. L. TAIT, Allied Ironfounders, speaker organizer.

The Pall Corporation, 30, Sea Cliff Avenue, Glen Cove, New York, USA, announce the appointment of Mr. LESLIE STEWART, B.SC., A.M.I.MECH.E., as assistant chief engineer. Mr. Stewart has been with the Corporation for the past three years, during which time he has held, successively, positions as project engineer and group engineer. He joined the Aircraft Porous Media, Inc., a subsidiary, shortly after he arrived in the United States from England where he studied at Loughborough College. For three years of this time he was lecturer of mechanical engineering at Corby Technical College, Corby.

FESIL SILICON BRIQUETTES

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Raw Material Markets

Iron and Steel

Production of high duty castings by the engineering and speciality foundries is maintained at good levels and, although the motor car industry has reduced its intake, substantial tonnages continue to be supplied. The foundries which supply chiefly to this industry are in some cases badly affected by the recession, but those with other consumers are in a much better position and are able to continue at normal weekly production rates.

Overall demands for pig-iron from the engineering and speciality foundries are at substantial levels, and in all grades of iron no difficulty is experienced in obtaining the required supplies. Low phosphorus irons continue the most heavily in demand, together with good quantities of hematite and some refined irons, but all these irons are readily available either from stock or current production.

The building trades continue to keep the light foundries supplying castings to them with sufficient business to enable reasonably good outputs to be maintained. Those supplying the domestic utensil trade are short of orders, and there is much spare capacity. The jobbing and textile foundries are fairly well engaged but most of them would welcome more business. The high phosphorus foundry pig-iron used by these foundries is plentiful and available supplies are more than adequate for present needs. Overseas buyers continue to take some of the excess tonnage. With the present easy supply position of pig-iron there is little forward buying.

Available supplies of scrap, apart from some special grades, are sufficient to cover the present needs of the foundries, foundry coke is coming forward satisfactorily and ganister, limestone, and firebricks are in good supply.

The re-rollers continue well employed although most of them could increase present outputs if more suitable labour were available. Good demands continue to be made for small bars and light sections, and the call for reinforcing bars is heavy. Most of the mills are well provided with steel semis in the mild steel grades, but those utilizing carbons and special qualities of steel find it more difficult to obtain the required supplies.

Arisings at the steelworks of suitable re-rolling defectives and crops are readily accepted by the re-rollers.

Non-ferrous Metals

The prolonged strike at Chuquicamata, Chile, is at last beginning to affect the copper markets in the UK and on the Continent. At least that is believed to be the reason behind the recent bear covering operations and the intermittent surges in demand above the routine level. Prices, too, have recovered and with no sign of any settlement of the strike in sight the present upward trend in prices looks like continuing. However, the present position in London is somewhat artificial as demand can only be described at best as quietly steady. Moreover, stocks continue to rise and totalled 10 655 tons at the end of last week. This represented an increase of 225 tons to refined copper stocks in LME warehouses.

In the US the market is quiet and there has been no marked change in demand for either producer or custom smelter copper at the existing price level of 30 cents a pound. In fact, dealer copper continues to be offered at something lower than the official price. The general belief is that production in October outran consumption which means further accretions to stocks.

Thus the outlook for copper is not altogether bright. The strike at Chuquicamata is the only real bull point in the market, but this could become a very important factor as it is reported that the mediator has resigned and that the present strike may soon involve other Chilean mines which are coming to the end of their contract with the unions.

Tin remains quietly steady in London, in New York, and steady in Singapore. Of especial interest were the export figures for October of tin from Malaya which showed that 6,937 tons were shipped compared with 6,237 tons in September which leads to the conclusion that despite the controls being lifted on the export of tin, there is no likelihood of the market being flooded with metal from accumulated stocks.

Stocks in LME warehouses retreated further last week, the reduction being 107 tons with stocks of 9,250 tons remaining. In the US the price is steady at $1.04 cents a pound.

Lead is a quiet market. Demand is fairly satisfactory but there is still a weight of metal pressing on the market. In the US conditions are unchanged as is the price which stands at 12 cents a pound.

Zinc is a fairly active market in London but, as with lead, there is more metal on offer than can be easily absorbed. In the US activity is only fair and the price is unaltered at 13 cents a pound.

Forthcoming Events

NOVEMBER 12

Institute of British Foundrymen

West Riding of Yorkshire branch: "Running and Gating of Castings," by W. W. Glick, 6.30 p.m., at the Bradford Institute of Technology.

NOVEMBER 14

North East Lancs. section:—"Mould Drying," by W. J. Colton, 7 p.m., at the Midland Hotel, Manchester.

NOVEMBER 16

Institution of Chemical Engineers

"Electrical Hazards in the Chemical Industry," by F. Clark, 6.30 p.m., in Lecture Theatre A, Houldsworth School of Applied Science, Reservoir Street, Leeds.

Institution of Production Engineers

Cornwall section:—"Holman Rotair Compressor," by F. B. Coombes, 7.15 p.m., at the Cornwall Technical College, Trevenson, Pool, Redruth.

Institute of British Foundrymen

London branch:—"CO_2 versus Other Methods," by A. Talbot and H. Haynes as the respective protagonists, 7.30 p.m., at the Constitutional Club, Northumberland Avenue, W.C.2.

NOVEMBER 17

Southampton Metallurgical Society

"Metallurgy of Beryllium," by Dr. Craik, 7.15 p.m., at Southampton University.

West of England Metallurgical Society

"Slag Functions in Non-ferrous Metallurgy," by Prof. R. Higgins, 7.30 p.m., at the College of Technology, Ashley Down, Bristol 7.

Institute of British Foundrymen

West Wales section:—Works visit to Richard Thomas & Baldwins, Limited, Landore, commencing 3 p.m., followed at 6 p.m., by a lecture on the "CO_2 Process—Then and Now," by A. Talbot.

NOVEMBER 18

Institute of British Foundrymen

British & West of England branch:—"Effect of Mould Materials upon the Properties of Castings," by J. Hird, 7.30 p.m., at the Royal Hotel, Bristol.

FACTS AND FRICTION

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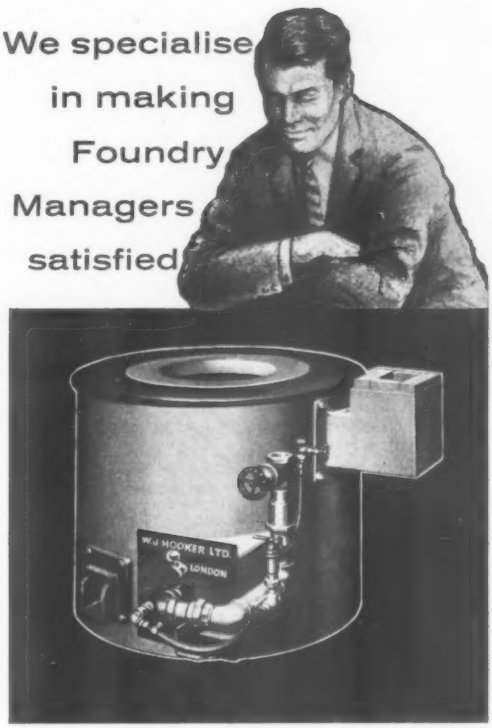

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Current Prices of Iron, Steel, and Non-ferrous Metals

(*Delivered unless otherwise stated*)

November 9, 1960

PIG-IRON

Foundry Iron.—No. 3 IRON, CLASS 2, 10-ton lots or over: Middlesbrough, £21 6s. 0d.; Birmingham, £20 18s. 3d.

Low-phosphorus Iron.—Over 0.10 to 0.40 per cent. P, 10-ton lots or over, £23 5s. 0d., delivered Birmingham, £23 10s. 0d., delivered Grangemouth.

Cylinder and Refined Irons.—North Zone, £25 6s. 6d.; South Zone, £25 9s. 0d.

Refined Malleable.—P, 0.10 per cent. max.; North Zone, £26 6d. 6d.; South Zone, £26 9s. 0d.

Hematite.—Si up to 2 per cent., S. & P. over 0.03 to 0.05 per cent., 10-ton lots or over; N.-E. of England (local iron), £23 19s. 0d.; Scotland (Scotch iron), Zone S.1, £24 5s. 6d.; Sheffield, £25 7s. 6d.; Birmingham, £25 14s. 0d.; Wales (Welsh iron), £23 19s. 0d.

Basic Pig-iron.—£20 3s. 0d., delivered Staffs, Derbyshire, Notts, Lincs, Rutland, Northants, and Leicestershire in 10-ton lots or over.

FERRO-ALLOYS

(*per ton unless otherwise stated, delivered*)

Ferro-Silicon (6-ton lots and over).—45 per cent. Si, £43 10s. 0d. to £46 0s. 0d., scale 15s. 0d. per unit, lumpy; 75 per cent. Si, £59 0s. 0d. to £63 10s. 0d., scale 15s. 0d. per unit, lumpy.

Ferro-vanadium.—50/60 per cent., 20s. 6d. per lb. of V.

Ferro-molybdenum.—65/70 per cent., carbon-free, 12s. 10d. per lb. of Mo.

Ferro-titanium.—20/25 per cent., 2-3 per cent. Cu, £250 0s. 0d.; 38/40 per cent., commercially carbon-free, £287 0s. 0d.

Ferro-tungsten.—80/85 per cent., 11s. 8d. per lb. of W.

Tungsten Metal Powder.—98/99 per cent., 14s. 8d. per lb. of W.

Ferro-chrome (6-ton lots and over, lumpy).—4/6 per cent. C, £81 10s. 0d. to £84 10s. 0d., basis 60 per cent. Cr. scale 27s. 0d. to 28s. 6d. per unit; over 6 per cent. C, £79 0s. 0d. to £82 10s. 0d., basis 60 per cent. Cr, scale, 27s. 0d. to 28s. 6d. per unit; 2 per cent. C,* 1s. 8d. to 1s. 11d. per lb. Cr; 1 per cent. C,* 1s. 8d. to 1s. 11½d. per lb. Cr; 0.15 per cent. C,* 1s. 9½d. to 2s. 0½d. per lb. Cr; 0.10 per cent. C,* 1s. 9¾d. to 2s. 0¾d. per lb. Cr; 0.06 per cent. C,* 1s. 11d. to 2s. 1d. per lb. Cr.

Metallic Chromium.—98/99 per cent., 6s. 10d. per lb.

Metallic Manganese.—94/96 per cent., carbon-free, £275 0s. 0d.; 96/98 per cent., £285 0s. 0d.

Ferro-columbium.—65/67 per cent., Cb + Ta, 19s. 9d. per lb., Cb + Ta.

Ferro-manganese (Standard).—78 per cent., £61 10s. 0d.

SEMI-FINISHED STEEL

Re-rolling Billets, Blooms, and Slabs.—BASIC: Soft u.t.s. 100 tons & over, £31 15s. 6d.; tested, 0.08 to 0.33 per cent. C, 6 to 35 tons, £33 15s. 6d.; hard (0.41 to 0.60 per cent. C), under 10 tons, £34 17s. 0d.; silico-manganese, under 10 tons, £43 16s. 6d.; free-cutting, under 10 tons, £36 14s. 6d. SIEMENS MARTIN ACID (under 10 tons): Up to 0.25 per cent. C, £41 1s. 0d.; silico-manganese, £44 4s. 0d.

Billets, Blooms, and Slabs for Forging and for Stamping under 10 tons).—BASIC: soft, up to 0.33 per cent. C, £38 10s. 0d.; basic, hard, over 0.41 up to 0.60 per cent. C £39 12s. 6d.; acid, up to 0.25 per cent. C, £43 4s. 0d.

* Average 68-70 per cent.

FINISHED STEEL

Heavy Plates and Sections (1 ton to 10 tons).—Ship plate (N.-E. Coast), £41 12s. 0d.; boiler plates (N.-E. Coast), £44 2s. 0d.; floor plates (N.-E. Coast), £43 10s. 0d.; angles (N.-E. Coast), £38 16s. 6d.; joists (N.-E. Coast), £38 12s. 6d.

Small Bars, Sheets, etc.—Rounds and squares, under 3 in., and flats 5 in. wide and under, untested soft basic, 50 tons and over, £39 1s. 0d.; under 10 tons to 4 tons, £40 18s. 0d.; under 4 tons to 2 tons, £41 3s. 0d.; hoop and strip, coils, 100 tons and over, £38 0s. 0d.; uncoated strip mill coils, hot rolled, under 3 mm. to 12g., 25 tons to under 50 tons, £43 16s. 0d.; black sheets (hand mill), 24g., 10 tons and over, £57 14s. 6d.; galvanized corrugated sheets, 24g., 10 tons and over, £68 5s. 0d.

Alloy Steel Bars.—1 in. dia. and up: Nickel, £67 17s. 0d.; nickel-chrome, £98 11s. 0d.; nickel-chrome-molybdenum, £111 4s. 0d., in lots of 5 tons to under 10 tons.

NON-FERROUS METALS

Copper.—Cash, £227 0s. 0d. to £227 10s. 0d.; three months, £227 0s. 0d. to £227 5s. 0d.; settlement, £227 10s. 0d.

Copper, Tubes, etc.—Solid-drawn tubes, 2s. 2¼d. per lb.; rods, 237s. 0d. per cwt. basis; 20 s.w.g., 271s. 6d. per cwt.

Tin.—Cash, £802 0s. 0d. to £802 10s. 0d.; three months, £799 0s. 0d. to £800 0s. 0d.; settlement, £802 10s. 0d.

Lead (Refined Pig).—First half November, £69 15s. 0d. to £69 17s. 6d.; first half February, £70 2s. 6d. to £70 5s. 0d.

Zinc.—First half November, £89 0s. 0d. to £89 5s. 0d.; first half February, £87 15s. 0d. to £88 0s. 0d.

Zinc Sheets, etc.—Sheets, 15g. and thicker, all English destinations, £124 7s. 6d.; rolled zinc (boiler plates), all English destinations, £122 2s. 6d.; zinc oxide (Red Seal), d/d buyers' premises, £102 10s. 0d.

Brass Tubes, etc.—Solid-drawn tubes, 1s. 10d. per lb.; sheets to 10 w.g., 195s. 9d. per cwt.; wire, 2s. 7¼d.; rolled metal, 195s. 9d. per cwt.

Brass (Brazing).—BS1400, B3, £171; B6, £225.

Brass (High Tensile).—BS1400, HTB1, £192; HTB2 £210; HTB3, £229.

Gunmetal.—BS1400, LG2, £213; LG3, £223; G1, ½%, £284; G1, 1%, £274.

Phosphor Bronze.—BS1400, PB1 (AID released), £306; BS1400, 90/10/1, £293.

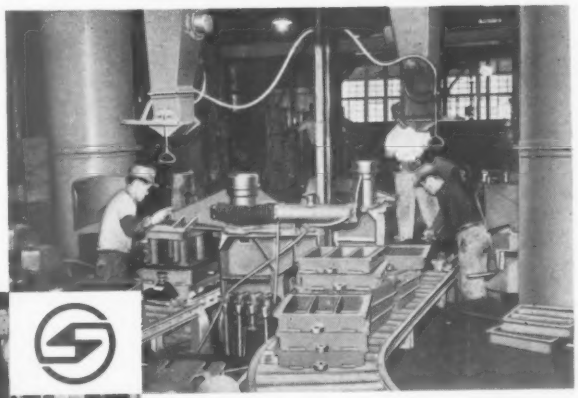
Leaded Phosphor Bronze.—BS1400, LPB1, £234.

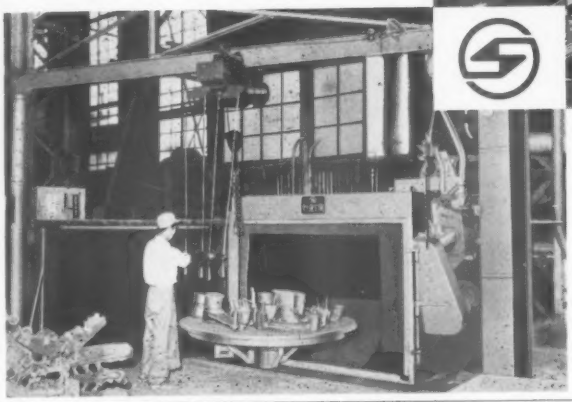
Phosphor Bronze Strip, etc.—Strip, 282s. 0d. per cwt.; wire, 3s. 11¾d. per lb.; rods, 3s. 3d.; tubes, 3s. 3d.; chill cast bars, solids 3s. 2¾d.; cored 3s. 3¾d (CHARLES CLIFFORD, LIMITED).

Nickel Silver, etc.—Rolled metal, 3 in. to 9 in. wide × 0.056, 3s. 10d. per lb.; round wire, 10g. in coils (10 per cent.), 4s. 3d.; special quality turning rod, 10 per cent., ½ in. dia., in straight lengths, 4s. 2d. All prices are net.

Other Metals.—Magnesium, ingots, 2s. 2½d. to 2s. 3d. per lb.; Antimony, English, 99 per cent., £200 0s. 0d. Quicksilver, ex-warehouse, £70 10s. 0d. Nickel, £600 0s. 0d. Aluminium, ingots, £186 0s. 0d.; aluminium bronze (BS1400), AB1, £243, AB2, £252

Progressive Foundries Specify SINTOKOGIO Equipment





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Company News

Aluminium Agreement

Formed earlier this year as a joint venture between Aluminium, Limited, of Canada, and Enfield Rolling Mills, Limited, Alcan Enfield Alloys, Limited, has concluded an agreement with Metal Closures, Limited, whereby it will lease on a long-term basis the aluminium-alloy smelter and zinc-alloy production facilities owned by John Dale, Limited, a member of the Metal Closures group.

As a result of the agreement Alcan Enfield Alloys will have the capacity to produce about 30,000 tons of aluminium alloys a year—about 20 per cent. of the total installed capacity in the UK. The company already operates a secondary aluminium smelter at Bradford for the production of foundry alloys from scrap and primary aluminium. John Dale will continue to own and operate its light-alloy foundry and continuous-strip casting plant, which will not be affected by the new arrangements.

JAMES GIBBONS, LIMITED, malleable ironfounders, makers of door furniture, etc., of Wolverhampton—The dividend is raised to 20 (18) per cent. Net profit, before tax, rose to £74,330 (£70,538).

CROMPTON PARKINSON, LIMITED—Final dividend of 7½ per cent. makes 12½ per cent. for the year ended June 30, 1960, compared with the equivalent of 11½ per cent. Group net profit was £1,276,067 (£1,317,637), after tax of £1,474,550 (£1,438,054).

GREENWOOD & BATLEY, LIMITED, electrical and mechanical engineers, etc., of Leeds—Details of the reorganization of the capital structure have been sent to holders. All the partly paid shares are to be eliminated and the preference holders' voting and capital rights are to be brought into line with modern practice.

HERBERT MORRIS, LIMITED, cranemakers, of Loughborough (Leics)—Group net profit for the year ended July 31, 1960, fell from £433,008 to £117,815, after tax of £279,233 (£409,943). Final dividend of 12½ per cent. makes 16½ per cent. on a capital doubled by a scrip issue. Last year the total distribution was equivalent to 12½ per cent.

G. D. PETERS & COMPANY, LIMITED, makers of railway and road rolling-stock equipment, etc., of Slough (Bucks)—There has been an improvement in group trading condition in the current year, state the directors, but profits in 1960 to date do not warrant the payment of an interim dividend. Last year a single 5 per cent. payment was made.

BERALT TIN & WOLFRAM, LIMITED—The chairman states that whatever the future may reveal, the company's profit-earning potential must for the time being be related exclusively to wolfram. With the market range for wolfram fluctuating between 150s. and 200s. the company could continue with a steady production of high-grade wolfram concentrates at a cost which would yield it satisfactory profit.

WILMER LEA FOUNDRIES (HOLDINGS), LIMITED—Acquisition of the trading companies of the parent company, Charles Karen & Son (Holdings), Limited—C.K.S. Group, Limited, and John Batt & Company, Limited—in exchange for cash and an issue of shares, is awaiting the issue of the 1960 accounts of the C.K.S. Group. Full and final details of the scheme will not be sent out until the end of February.

TUBE INVESTMENTS, LIMITED—Final dividend of 9¾ per cent. is to be paid on a capital increased by a one-for-one rights issue and shares issued against the acquisition of Raleigh Industries, Limited, compared with a forecast of not less than 8¾ per cent. The interim of 8½ per cent. was paid prior to the rights issue. In 1958-59 the total dividend was 20 per cent. Group net profit was £8,100,735 (£6,458,460), after tax of £9,663,793 (£6,152,202).

SIMMS MOTOR & ELECTRONICS CORPORATION, LIMITED—The interim dividend for 1960 is maintained at 5 per cent. on a capital increased by a one-for-five scrip issue. The 1959 final was 10 per cent. It is proposed to make a one-for-10 scrip issue. The subsidiary, Simms Motor Units, Limited, has acquired Fuel Feed & Injection, Limited, Preston. This company will continue to trade under its present name, offering branch facilities to Simms' customers in that part of Lancashire north of a line from Banks to Shawforth.

COGHLANS, LIMITED, iron and steel founders, etc., of Leeds—The dividend is maintained at 15 per cent. for the year ended March 31, 1960. Group net profit was £41,682, compared with a loss of £12,593, after tax of £26,457 (£128)-. A scrip issue of 100,000 £1 ordinary shares on the basis of two for each ordinary held on November 23 is proposed. The directors state that the £100,000 spent in building and plant extension and modernization during the last three years enabled the company to take advantage of the favourable conditions in 1959-60 and to record its highest-ever profit.

GKN Rights Issue Proposal

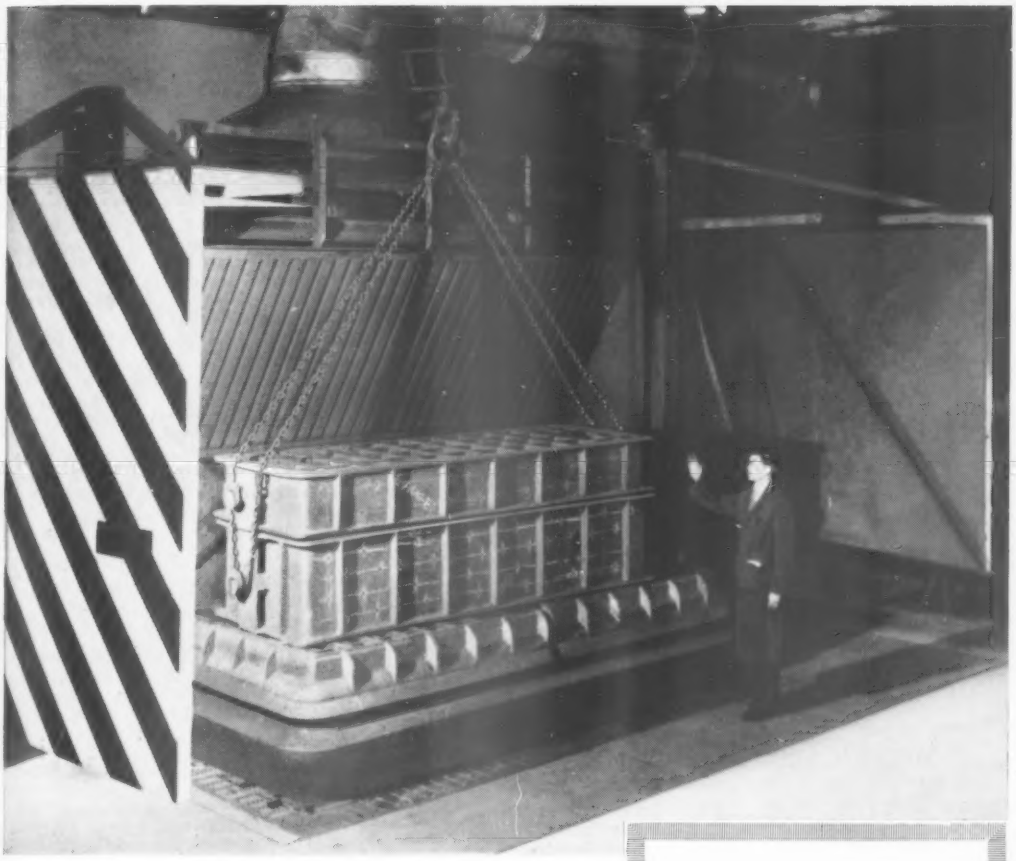
Deciding that it would be unwise to delay the introduction of new finance and as it is not its policy to come frequently to the market, the board of Guest, Keen & Nettlefolds, Limited, proposes to raise a large sum now which it is hoped will be sufficient to carry through the next few years. A one-for-six rights issue of 6,582,011 new ordinary shares at 70s. per £1 share—payable 30s. on or before December 15 and the balance by February 1, is to be offered to holders. Net proceeds will amount to about £22,600,000.

The board states that the group's annual rate of capital expenditure is unlikely, during at least the next three years to fall below the 1959 level of £18,000,000. While profits retained, including depreciation, in 1959, provided over £17,000,000 towards this expenditure, liquid resources fell during that year by about £5,000,000 to £15,000,000 owing to the pressure of increased turnover on working capital.

Continued expansion and consequent necessity for increased working capital may be expected to result in the liquid resources being increasingly depleted as plans mature. Immediate advantage can only be taken of new opportunities for investment and expansion which arise from time to time if adequate financial resources are in hand.

The interim dividend is maintained at 5 per cent. from trading profits of 1960 and, in addition, a special non-recurring dividend of 2½ per cent., not subject to tax, is declared from profits realized during 1960 by a continuance of the policy of reducing the portfolio of investments. It is intended to recommend a final of 10 per cent. (same) payable on the increased capital.

The directors state that it seems probable from information now available that the surplus for 1960 before tax, excluding the special surplus on sale of investments and other exceptional items, will not be less than £29,000,000, compared with £25,800,000 in 1959.



Baker Perkins Foundry Machinery at work... *at English Steel Castings Corporation Ltd.*

This shakeout unit has a working deck of 12 ft. x 5 ft. and takes a five-ton load. Under it are twin hoppers with a total capacity of 160 cu. ft. A plate feeder unit and Baker Perkins conveyor take the sand from storage at a rate of 80 tons an hour. No job is too large—or too small—for Baker Perkins—the firm with the complete range of foundry machinery.

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HISTORICAL NOTE

With a background of over 100 years in steel foundry practice, English Steel Castings Corporation Ltd. produces a wider variety of steel castings than any other steel foundry in the world (from a few pounds to 185 tons individual weight) and operates the most comprehensive plant in Europe.

News in Brief

A NEW COMPANY, American Motors South Africa (Pty.), Limited, has been established by the American Motors Corporation, of Detroit, to investigate the possibility of making a South African car. In association with Stanley Motors, Limited, South African assemblers, the new company will explore possibilities of local manufacture. Mr. J. R. Bordern, regional director for Africa of American Motors Corporation, becomes managing director of the South African company.

A POCKET-SIZE BOOKLET on welding metallurgy, priced at $2, has been published by the American Welding Society from 33, West 39th Street, New York 18. It is a condensed textbook on ferrous and non-ferrous welding metallurgy reprinted from the "Welding Handbook," in response to the need for an inexpensive, short, comprehensive text on the subject. It should prove useful for all training programmes where the fundamentals of welding metallurgy are involved.

THE MIDDLETON RAILWAY IN LEEDS, which was operating half a century before Stephenson's Stockton-Darlington line, and is now worked by the Middleton Railway Preservation Society, started a new service on October 31 for Clayton Son & Company, Limited, structural engineers of Moor End, Hunslet, Leeds. The line has been worked by the Society twice a day for concerns with works near the track. In October the Society carried more than 500 tons of scrap metal for a Hunslet merchant.

OVERSEA SERVICE, 2, Eaton Gate, London, S.W.1, aonnunce that reservations are now being accepted for the next introductory course on the Middle East to be held at Moor Park College, Farnham, from January 16 to January 21, 1961. The course will be primarily for those going out to the Middle East for the first time or those who, for various reasons, require more detailed knowledge of the economic, political and social conditions in the area in which is included Iran, Arabia, Sudan and Egypt as well as the more central States.

A RESEARCH ASSOCIATION for drop forging has been formed in Sheffield, where it will be centred on the laboratories of the British Iron and Steel Research Association in Hoyle Street. It has been registered as a company limited by guarantee and includes a number of Sheffield firms among subscribers. The first directors include Dr. C. J. Dadswell, of the English Steel Corporation, Limited, Mr. John L. Hewitt, of George Turton Platts & Company, Limited, Sheffield, and Mr. Samuel Johnson, of Daniel Doncaster & Sons, Limited.

A NEW ENGINEERING INDUSTRY is to be set up in Dumfries by the Dalzell Electric Welding Company, Limited, Belshill, Lanarkshire. It will be known as Holmes Alexander, Limited, and will trade under the name of Holmealex. At present Dalzell Electric is engaged on the manufacture of lightweight tanks for transport of milk, petrol, and acids, as well as in trailer production and general engineering. In Dumfries the company may also start to manufacture tipping bodies. It is expected that the new project will mean employment for about 200 local men.

S. A. WHITE MARTINS, of Rio de Janeiro, affiliated with Union Carbide Corporation, announce that their new liquid-oxygen plant, said to be the largest of its kind in Latin America, recently went on stream. The plant has the capacity to produce up to 25,000,000 cu. ft. of liquid oxygen per month, and can produce liquid nitrogen and high-purity argon as well. Storage facilities for 10,000,000 cu. ft. of liquid oxygen have also been completed. The plant is expected to fulfil the demands for these liquified gases in the rapidly expanding economy of the Sao Paulo area for several years.

MORGAN CRUCIBLE COMPANY, LIMITED (from Woodbury Lane, Norton, Worcester) announce a range of price reductions for all Suprex TPC patterns of crucibles. At the same time increased prices—the first since 1955—are listed for certain patterns of Salamander Super TP crucibles and for lift-out crucibles of shapes "A," "C" and "D" in the same material. The prices of the lift-out crucibles of the Suprex grade are unchanged. Changed prices come into force immediately, but for orders in hand, and November deliveries against standing instructions, the old prices will rule.

AT THE ANNUAL MEETING of the Dudley Area of the National Union of Manufacturers on October 25, Mr. W. E. Hanke was re-elected chairman, Mr. R. A. Mills, vice-chairman, and Mr. H. W. Lawton, secretary. Presiding at the ninth annual dinner which followed the meeting, Mr. Hanke said that small firms, whose combined production comprises such a large proportion of the national output, had the greatest need for the NUM, and this point was stressed again by Professor Gilbert Walker, Professor of Commerce at Birmingham University, who was one of the guest speakers at the dinner

Obituary

Mr. ERIC FREER, a 58-year-old director of the Staveley Iron & Chemical Company, Limited, Derbyshire, collapsed and died in Paris shortly after attending an international conference of representatives from the cast-iron pipes industry. Mr. Freer joined the Staveley company more than 40 years ago, starting in the drawing office. In 1927 he was appointed chief draughtsman to the company's technical adviser and in 1943 was promoted to production manager of the foundries department, and later works director. He was appointed foundries general manager in 1954. Mr. Freer was a member of the Institute of Mechanical Engineers and the Institute of British Foundrymen. He was also a member of Council of the British Cast Iron Research Association and of its development committee.

Widely known both in Britain and on the Continent as head of the United Kingdom delegation to the High Authority of the European Coal and Steel Community, from 1952 to 1955, SIR CECIL MCALPINE WEIR died last week aged 70. Before representing the UK in Luxembourg, Sir Cecil had been a prominent figure in Whitehall and in the Control Commission for Germany. During the last war he served, sometimes concurrently, as Controller-General of Factory and Storage Premises, Director-General of Equipment and Stores, and Business Member of the Industrial and Export Council of the Board of Trade. He then became Economic Adviser to the Control Commission and this was followed by two years as chairman of the Dollar Exports Board. He was chairman of the British Tabulating Machine Company, Limited, for many years, and of the recently-formed International Computers & Tabulators, Limited, a director of Pyrene, Limited, and British Enka, Limited, and a part-time member of the British Transport Commission. Sir Cecil was knighted in 1938 for the major part he played in creating the Empire Exhibition in Glasgow.

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Since 1844, there have been Foundries in the RICHARDS Group. After World War II new sand preparation and handling plant was needed to ensure greater output and efficiency. Richards knew from long experience what they wanted – they designed and built their own plant (which included, of course, the now well tried and proven MULL MIXER). Every item was made to avoid the foundryman's nightmare – breakdowns and heavy maintenance.

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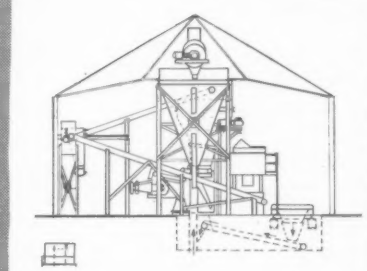

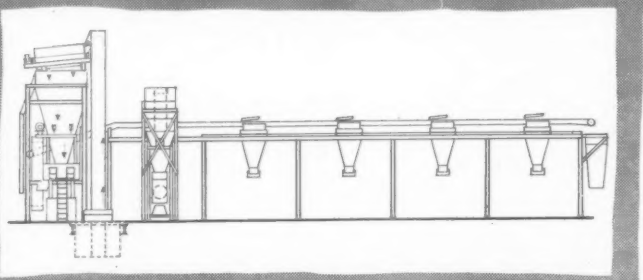

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PREPAID RATES: **Twenty words for 10/- (minimum charge) and 4d. per word thereafter. Box numbers 2/6 extra per insertion (including postage of replies). Situations wanted 2d. per word throughout.**

Advertisements (accompanied by a remittance) and replies to Box Numbers should be addressed to the Advertisement Manager, Foundry Trade Journal, John Adam House, 17/19, John Adam Street, Adelphi, London, W.C.2. If received by first post Monday advertisements can normally be accommodated in the following Thursday's issue.

SITUATIONS WANTED

FOUNDRY MANAGER/METALLURGIST with comprehensive experience of mechanised sand, shell, centrifugal and continuous casting processes in non-ferrous and light alloys, seeks post offering scope for initiative and advancement. Box FM932, FOUNDRY TRADE JOURNAL.

TO TOP MANAGEMENT—Could you use a qualified loyal Deputy to take some load off you? Advertiser (33) with wide executive experience in all aspects, technical, production and commercial, seeks position with medium sized grey or malleable firm which will eventually lead to the top. Present salary £2,100. Box TT933, FOUNDRY TRADE JOURNAL.

FOUNDRY MANAGER (and Director), aged 37, L.I.M., M.I.B.F., desires change. Experience covers all aspects of grey and high duty iron casting manufacture and customer relationship. Present salary £1,200, car and bonus. Box DA920, FOUNDRY TRADE JOURNAL.

NON-FERROUS Foundry Foreman, experienced in all parts of foundry trade, production, metal control, quotations, furnaces, CO_2, experienced in all metals, seeks position in West Country. Box NF925, FOUNDRY TRADE JOURNAL.

ENGINEER/FOUNDRYMAN (40) seeks position as Works Engineer/Manager. Background and experience includes highly mechanised foundries, installation development, etc. Salary £1,750—£2,000. Northern England preferred. Box EF926, FOUNDRY TRADE JOURNAL.

SITUATIONS VACANT

FOUNDRY EXECUTIVE—MANAGER required by well known Midlands company in the industry to take control of modern foundry plant which will come into operation in March, 1961. Applicants should have, in addition to first class technical training in modern foundry production technique, a record of proven management ability. This appointment carries a high salary and unlimited scope for personal advancement. Full particulars to MANAGING DIRECTOR, Box FE936, FOUNDRY TRADE JOURNAL.

SITUATIONS VACANT—*contd.*

REQUIRE Assistant Gravity Die-Shop FOREMAN to work in New Die Foundry. Must be fully experienced in all aspects of Gravity Diecasting work preferably between 25/35 years of age.
Apply in confidence to:—
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The Guest Keen & Nettlefolds Group of Companies wish to make the following appointment in one of their constituent companies.

PRODUCTION ENGINEER

An Iron Foundry and Heavy Engineering Works in South Wales employing over 600 people requires a Production Engineer. Applications are invited from engineering graduates or Associate Members of the Institute of Mechanical or Production Engineers who are between 30 and 45 years of age, have served a recognised apprenticeship, and have had practical experience of production engineering and control in a Foundry or Heavy Engineering Shop. Experience of work study and engineering estimating would be a valuable qualification. The Production Engineer will be responsible to the Works Manager for the establishment of the methods of manufacture to be adopted, the tools and machines to be used, the materials required and the basic time necessary for the completion of each order, the maintenance of records of machine and section loading and the planning and scheduling of the output of the whole Works.
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Group Personnel Officer,
GUEST, KEEN & NETTLEFOLDS Ltd.,
66, Cannon Street, London, E.C.4.

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FOUNDRY FOREMAN required for medium sized Steel Foundry in the Glasgow area. Applicants should possess a sound practical background and be conversant with the latest developments in Steel Foundry practice. Staff conditions. Pension Scheme, excellent canteen and good travelling facilities. Apply Box FR910, FOUNDRY TRADE JOURNAL.

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Candidates should be between the ages 30-45, have served an apprenticeship in a modern Ferrous Metal Foundry producing high quality castings, and have at least four year's experience in Work Study in this field. A knowledge of labour cost control would be an advantage.

The successful candidate will be responsible to the Works Manager for:—
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Applicants should state fully the details of their training and experience and also indicate the salary required.

This is an excellent opportunity for a man who is able to use initiative and achieve first class results.

Apply: **The Secretary, The Coalbrookdale Co. Ltd., Ketley, Wellington, Shropshire.**

SITUATIONS VACANT—*contd.*

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Write briefly in strictest confidence to Box AS934, FOUNDRY TRADE JOURNAL.

GENERAL MANAGER for Blackheart Malleable Iron Foundry. Must have sound practical experience. Excellent prospects. West Midlands district. Minimum salary £2,000. Box GM935, FOUNDRY TRADE JOURNAL.

FOUNDRY FOREMAN required for small well equipped Iron Foundry, light to medium, CO_2 and green sand, sole charge, South Coast. Housing assistance. Pension Scheme. Write in confidence; interview expenses. Box FF917, FOUNDRY TRADE JOURNAL.

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FOUNDRY FOREMAN required by old established Engineering Firm in East Anglia; pleasantly situated in small country town within a few miles of the sea. The successful applicant will be required to take control of the Iron Foundry and to be responsible for estimating, fixing of piece work prices, quality of metal and production. Please apply in writing, quoting age, experience, and salary required to the ASSISTANT GENERAL MANAGER, Box FF928, FOUNDRY TRADE JOURNAL.

FOUNDRY METALLURGIST required for technical control duties in grey iron and non-ferrous foundries in Northern Ireland; age 25/35. Send details of experience, age and salary required to Box FM923. FOUNDRY TRADE JOURNAL.

TECHNICAL REPRESENTATIVE required for London and Home Counties, selling iron and steel castings and precision stampings. Experience and connections in these fields essential. Permanent progressive position. Detailed applications Box TR924, FOUNDRY TRADE JOURNAL.

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IRON Foundry in North Staff. require ASSISTANT to Foundry Manager. Able to put 40 tons weekly. Good opening for young energetic man. State experience and salary. Box IF931, FOUNDRY TRADE JOURNAL.

BRITISH INDUSTRIAL SAND LTD. require a JUNIOR TECHNICAL SALES REPRESENTATIVE for Midlands area, aged 23/28. Education to be at least G.C.E. level. Preference given to man with some sales and foundry experience, especially A.M.I.B.F. Good salary, company car, and Pension Scheme. Excellent prospects in expanding organisation. Written applications only in first instance to: AREA SALES MANAGER, British Industrial Sand Ltd., 35, Silver Street, Leicester.

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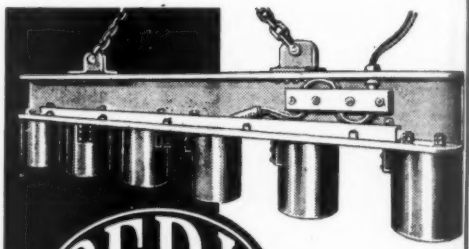

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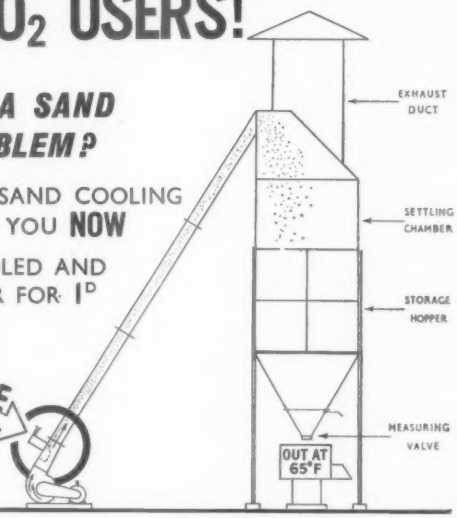

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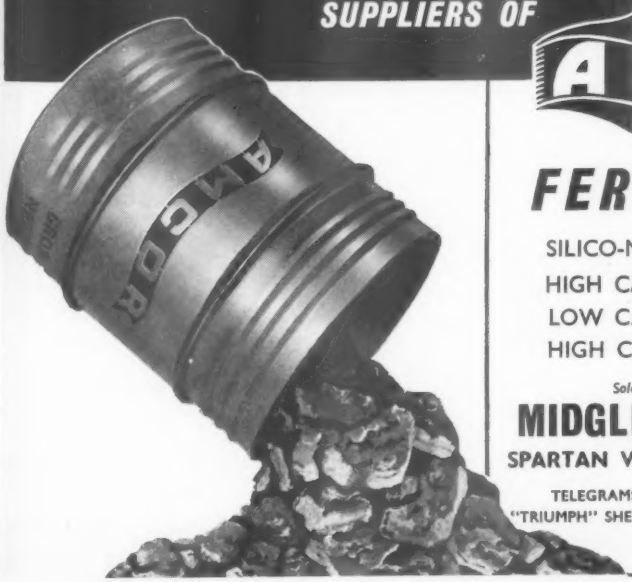

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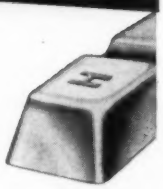

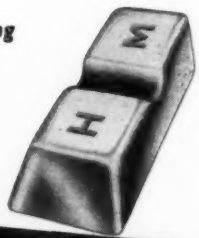

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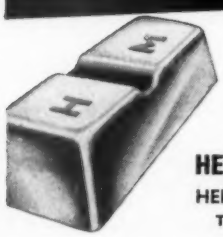

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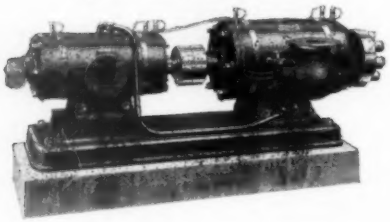

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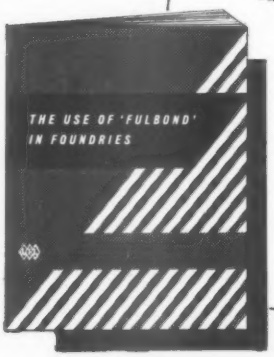

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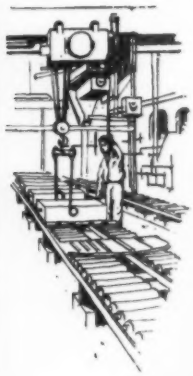
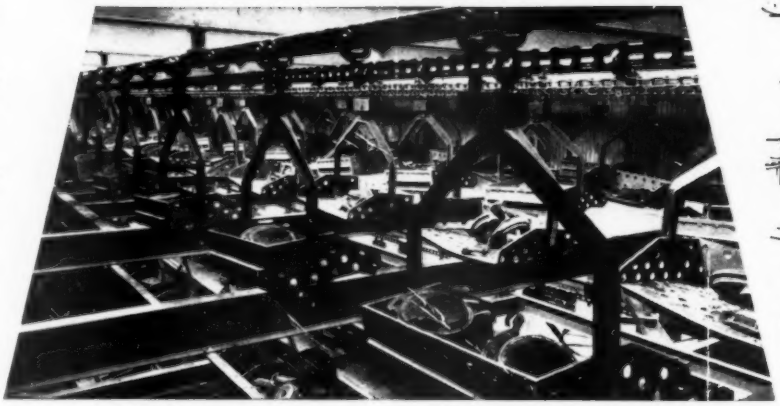
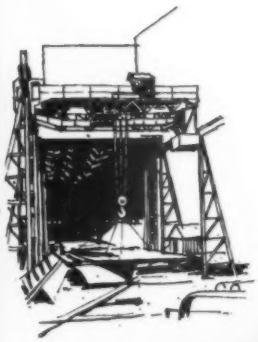




Part of a Paterson Hughes Cooling Conveyor which takes the castings clear of the floor and allows them to cool on the journey to the fettling shop.



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The Foundry Division has long experience in the foundry industry. Many examples of Paterson Hughes pouring runways, conveyor systems, complete sand handling plants, cupola charging plants, casting cooling conveyors, are at work throughout the industry today. Widely used too are Paterson Hughes Overhead Travelling Cranes available up to 100 tons capacity.

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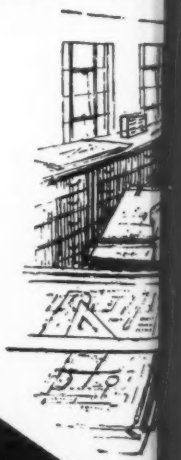

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